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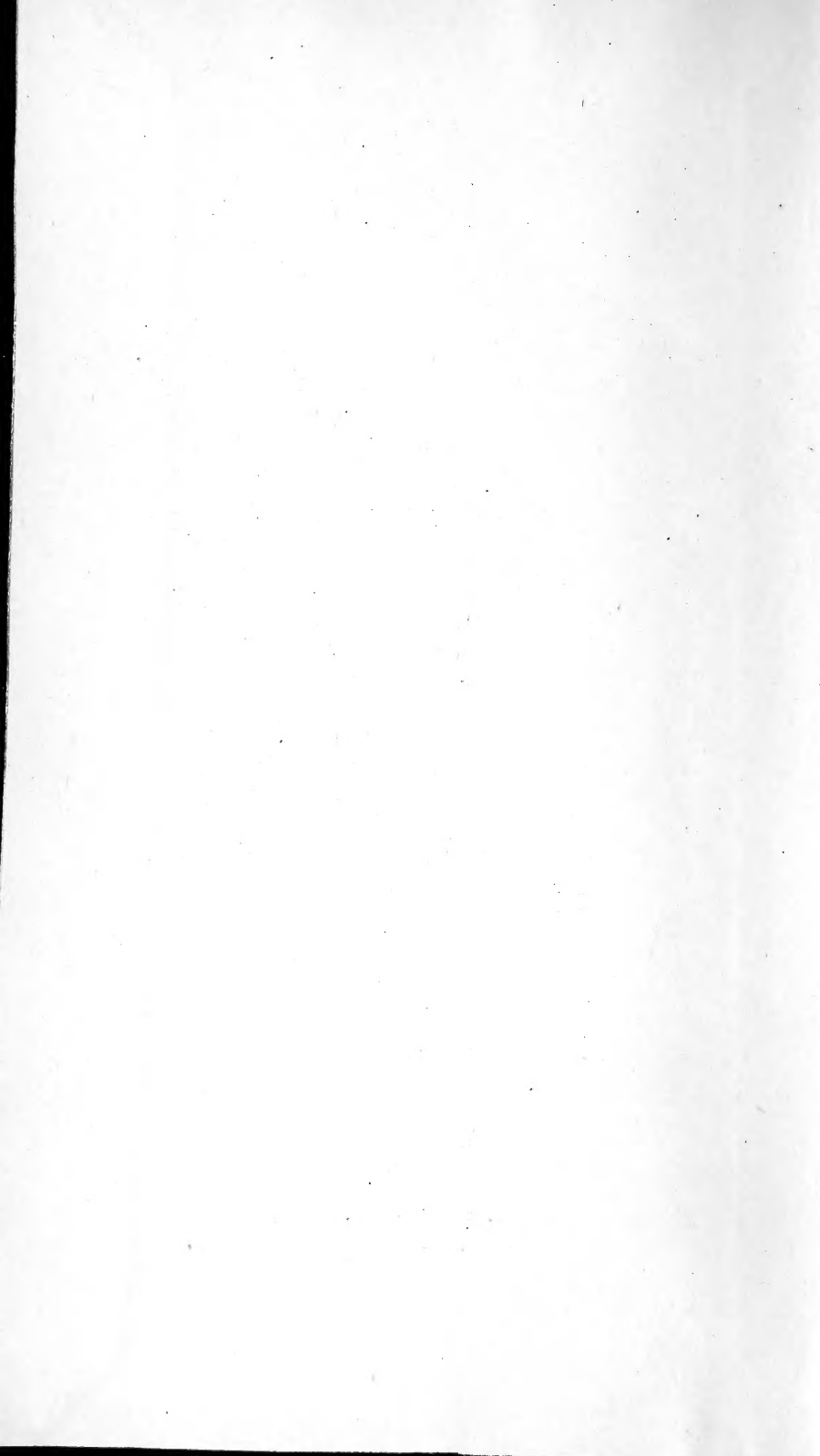
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THE  
AMERICAN  
JOURNAL OF PHARMACY.

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PUBLISHED BY AUTHORITY OF THE  
PHILADELPHIA COLLEGE OF PHARMACY.

EDITED BY  
HENRY TRIMBLE.

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PUBLISHING COMMITTEE FOR 1894.

HENRY N. RITTENHOUSE, WALLACE PROCTER,  
SAMUEL P. SADTLER, JOSEPH W. ENGLAND,  
AND THE EDITOR.

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VOLUME LXVI.  
FOURTH SERIES, VOLUME XXIV.

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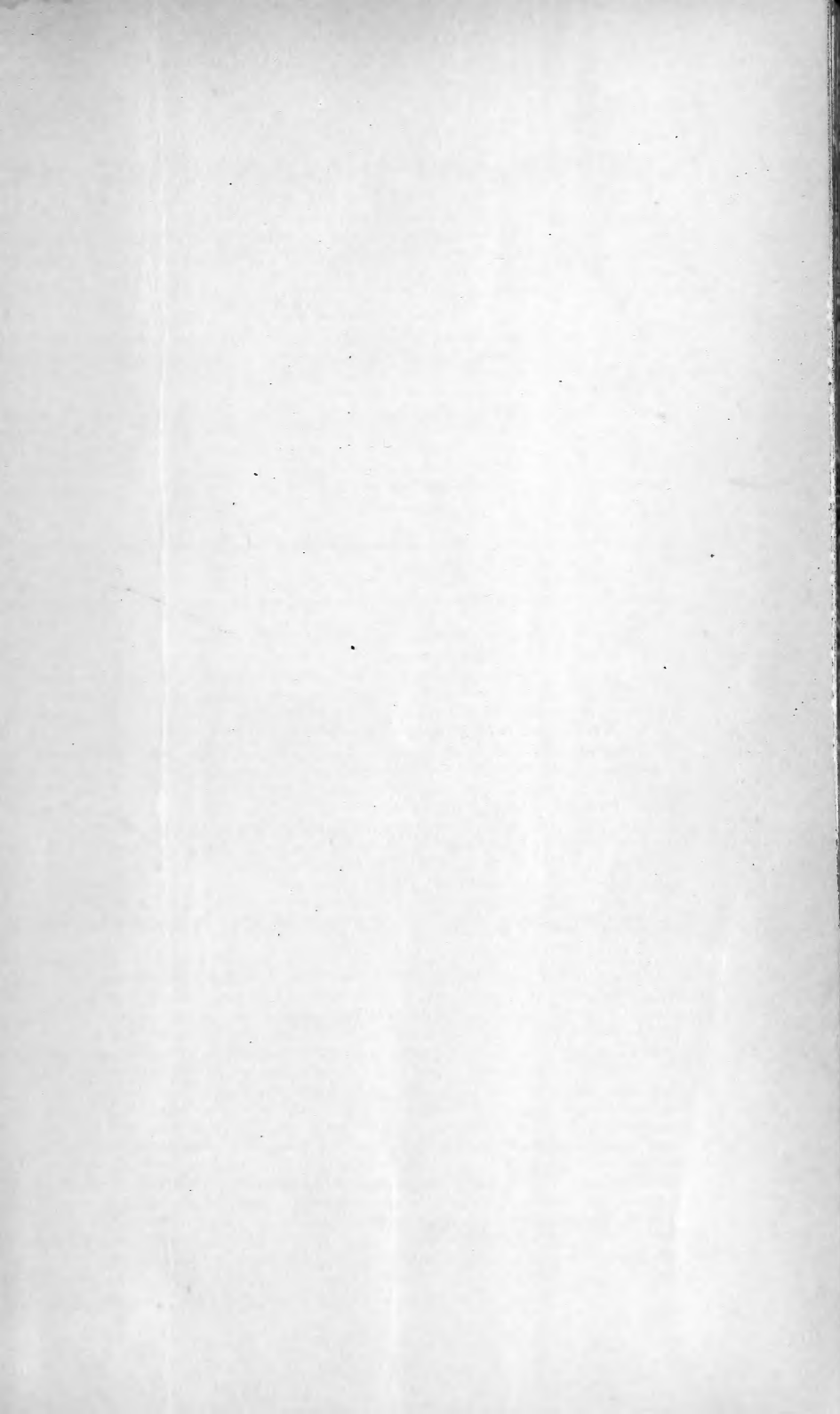
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# THE AMERICAN JOURNAL OF PHARMACY.

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*JANUARY, 1894.*

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PROF. J. M. MAISCH. —

Professor John Michael Maisch was born in Germany, at Hanau on the Main, on the 30th of January, 1831, his father being Conrad Maisch, a merchant of moderate means in that town. He attended at first a private school and later the city free school. When at the age of ten he had passed through the four classes of this institution, he was admitted into the middle public school.

Here he soon attracted the attention of his teacher to such an extent that in a short time he became a frequent visitor at Pastor Wörishoffer's home. By him he was employed to correct the lessons of the lower class and in return received instruction in the rudiments of French. At the age of twelve and a half years he left this school, and on the advice of his parents he determined to learn the jewelry business, Hanau being justly renowned for the skilful work of her artisans in this trade. His instruction here lasted, however, only a few days, as he was still of the age when he was compelled by law to attend school and his parents could not obtain an official dismissal. School Inspector Roeder, on the recommendation of his Pastor Wörishoffer, however, obtained for him free instruction in the class of the Realschule into which he was taken on trial. Here again he proved an apt scholar and drew the attention of his teacher, Pastor Beinhauer. Roeder having obtained permission to open an Oberrealschule, Maisch was taken into the third division. Theobald, the teacher of Botany and Zoölogy, became interested in the young student and revealed to him the wonders of the microscope. Under the same direction Maisch attended botanical and mineralogical excursions in the vicinity of Hanau. These oppor-

tunities awakened in the young man a decided liking for the natural sciences and in great part shaped the course of his after life.

Beinhauer was orthodox and while Roeder was an ordained preacher, his passion for the natural sciences led him more and more into different channels until he taught only these branches. Having the companionship of two such men, the idea of the union of religion and science had something fascinating for Maisch, which was further encouraged by the promise of his teachers to prepare him for the University and the wish of his mother to see her son a pulpit orator.

The school which Maisch was attending did not have in its curriculum the necessary branches to permit his matriculation at a university and this forced him to obtain outside private lessons, especially in the dead languages. Of much greater importance was the beginning of the instruction in chemistry under Dr. Bromeis, for he took great interest in chemical experiments and was known among his companions as a very earnest student. Bromeis encouraged his students to begin original researches and he permitted Maisch to assist him in the continuation of his work on the fatty acids and resins. These opportunities caused Maisch to give up his intention of studying theology and devote himself entirely to the natural sciences as a life-work, but it seemed as if fate had ordained otherwise.

It was the intention of his teachers to prepare him so that he would be admitted into one of the upper classes of the Gymnasium; this demanded from him extraordinary exertion, which was too much for his weakened constitution, and at the close of the school year, we find him confined to his bed by sickness. On his recovery, and after a conference with his physician, his teachers advised him to relinquish the idea of studying at a university, as they considered it beyond his powers of endurance. With a sad heart he followed their advice, and intended to take up the study of pharmacy, but here similar obstacles were encountered, the improbability of his obtaining the concession of an apothecary being the principal one. He then entered the service of Hesse, and about this time he joined the Turners of Hanau, and with them made the excursions which have become memorable in the history of the valley of the Main. These excursions were not taken so much to extend the use, or show the value of gymnastics, as to spread the sentiments of revolution,



so prevalent at that time. Maisch assisted in this with all his powers, and in consequence he left the service of the State, as he thought it was inconsistent to be in its service in the daytime, and working against it at night. In 1849, he accompanied the Turners on an excursion to Baden, and was captured at Sinsheim, but with the assistance of some comrades he escaped from prison and returned home, and ultimately emigrated to America, landing in Baltimore. On his arrival he was almost penniless, and to supply the necessities of life he obtained employment in a paper-box manufactory, and subsequently in a mattress factory until about half a year later he made the acquaintance of Dr. Wiss; this gentleman desired to open a drug store, which he afterwards succeeded in doing, and Mr. Maisch took charge of the store for him during a few months in 1850, after being instructed by Dr. Wiss and Dr. Vogler, and gaining more knowledge from books placed at his disposal by Dr. Wiss. Towards the end of 1851, the drug store was sold to other parties, and Maisch then obtained employment in Washington, where he held the position of assistant in a drug store until 1853, when he went to Philadelphia, as his parents and some of his sisters had arrived there from Europe. Until 1855, he acted as clerk in Philadelphia and New York and in the latter part of this year was employed in a chemical factory of Brooklyn. In 1856, Mr. Maisch returned to Philadelphia and accepted the position of clerk, with E. B. Garrigues and Robert Shoemaker & Co., until 1859, he then took charge of one of the departments of instruction in the School of Pharmacy for medical students, which was conducted by Prof. Parrish, in an upper room in the building at the southwest corner of Eighth and Arch Streets, the first story of which was occupied as his drug store. In 1861, Mr. Maisch was called to the College of Pharmacy of the City of New York, as Professor of Pharmacy and Materia Medica, and for the time in which he was not engaged in his duties at the College, he found employment at the laboratory of Dr. E. R. Squibb. In 1863, Prof. Maisch returned to Philadelphia to organize and conduct the U. S. Army Laboratory, proposed by Surgeon-General Hammond, and of this he was Director until the close of the war. In these two and a half years of the existence of the Laboratory there was a saving of more than \$750,000 to the Government. After the close of the war, Prof. Maisch opened a drug store at 1607 Ridge Avenue, which he conducted

until 1871, when he was compelled to dispose of it, in order to give his whole attention to his duties at the Philadelphia College of Pharmacy and the Secretaryship of the American Pharmaceutical Association. In 1856, Mr. Maisch joined the American Pharmaceutical Association, and in 1860 was made Reporter on the Progress of Pharmacy. Here he introduced the arrangement of the articles which has since been retained. In 1863, he was made First Vice-President; in 1865, was elected Permanent Secretary, which position he retained until the time of his death. When, in 1867, the American Pharmaceutical Association offered its assistance to the legislatures of the several States, with a view of formulating pharmacy laws, Prof. Maisch collected by correspondence with the Governors of the several states the laws and regulations then in force, and he retained his interest in this subject as long as he lived. Until the time of his return to Philadelphia, in 1856, on account of the pressure of other duties, Mr. Maisch had no chance to use a microscope, but towards the end of 1860 he induced the College of Pharmacy to obtain a good one, he himself collecting from the members a part of the purchase-money. The microscope arrived in the beginning of 1861, and was used by Prof. Maisch in his work until he came in possession of one himself. His early love for Microscopy was shown by these successful efforts in inducing the College to procure a fine instrument. With this he made a number of investigations and ultimately was able to procure an instrument of his own.

The College of Pharmacy attracted the attention of Mr. Maisch as soon as he arrived in Philadelphia, and it was not long before he was elected a member and became a contributor to its Journal. The earnest manner and industrious habits of the young German made an indelible impression upon the Editor of the Journal and the Professor of Pharmacy in the College, Wm. Procter, Jr. To such an extent had the subject of this sketch impressed his favorable qualities upon the members of the College and all who had come to know him, that it was not surprising to find that upon the relinquishment of the chair of Pharmacy, in 1866, by Prof. Procter, on account of ill health, that John M. Maisch was called upon to fill the vacancy. In 1867, however, Prof. Maisch exchanged chairs with Prof. Parrish and at the same time the title of the chair of *Materia Medica*, formerly held by Prof. Parrish, was enlarged so that it became that of "*Materia Medica and Botany.*" This was a

wise step for the College to take, as each Professor subsequently greatly enlarged his sphere of action and each found a more congenial field for his respective talents. Prof. Maisch retained the chair of Materia Medica and Botany until the time of his death, a period of twenty-six years, and the services which he has rendered to American Pharmacy during this time can never be forgotten.

More than two thousand students have profited by his thorough and painstaking instruction, and can attest to the profundity of his knowledge and the unwearied industry which he ever manifested in the discharge of his official duties.

His connection with this Journal began at an early date and was continued as long as he lived, first, when only twenty-three years old as a writer of papers, and twelve years afterwards he succeeded the talented Procter as editor. When ill health compelled Prof. Procter, in 1870, to resign the editorship of the American Journal of Pharmacy, Prof. Maisch was unanimously chosen to fill the position and at the same time the Journal was enlarged by making it a monthly instead of a bi-monthly publication, and the same qualities with which he was so plentifully endowed were now enlisted in this new field of labor. The year 1870 was an eventful one for him, for in addition to his other duties, he was called to take charge of the chemical laboratory, which had been organized in the College, through the efforts of the Alumni Association.

His interest in Pharmaceutical literature, and his desire to add to the sum of knowledge in his chosen profession, was manifested soon after he arrived in Philadelphia, and the first paper which he wrote for the American Journal of Pharmacy, appeared in March, 1854, the title being "On the Adulteration of Drugs and Chemical Preparations." This was a subject which was always an attractive one to his mind at all periods of his professional career, many of his papers in the later years of his life being devoted to the detection of adulterations, sophistications and accidental contaminations found in drugs. This was a natural consequence of his settling down to the conviction that his life-work would be more in Pharmacology than Pharmacy, and his election to the chair of Materia Medica, in 1867, and subsequently the issue of the National Dispensatory, and particularly the appearance of his work on "Organic Materia Medica," showed the main trend of his researches, the former work had Dr. Alfred Stille, as medical author, he furnishing the therapeu-

tical contributions, whilst Prof. Maisch supplied the botanical, chemical and pharmaceutical material; this work has gone through four editions. He doubtless felt the necessity, as his duties multiplied, of giving the most attention to Pharmacognosy, and it has been fortunate for American Pharmacy that he recognized the direction in which he could use his talents to the best advantage. That he was fond of chemical investigation, no one can doubt; the many chemical papers which have been published in the Journal will attest to this truth; his devotion to the interests of Pharmacy is shown by the fact that nearly all of his contributions have a bearing upon subjects more or less directly connected with the alleviation of human suffering.

The second paper, which he wrote in 1854, was on "*Liquor Ferri Iodidi*." His subsequent contributions were as follows: In 1855, three chemical papers and two translations; in 1856, three papers on "*The Relations of Physicians and Pharmacists*," and five on pharmaceutical subjects. Of six papers appearing in 1857, four were on pharmacy and two were chemical; in 1858, four pharmaceutical and one chemical paper; in 1859, six pharmaceutical and one on a new system of German weights; in 1860, three chemical and five pharmaceutical; there also appeared in this year a very useful feature, "*Abstracts from Foreign Journals*," which Professor Maisch termed "*Gleanings*." His "*Announcement of the School of Practical Chemistry and Pharmacy*," 800 Arch Street, of which he was made Director, appears in the May number of this year.

On the 24th of September, 1860, he was elected member of the Board of Trustees of the Philadelphia College of Pharmacy. His first botanical paper appeared in the Journal in 1861, and is entitled "*On Chelidonium Majus*." This contains also a chemical account of the constituents and properties of the plant. This was one of his active years, for there were published besides six chemical, three pharmaceutical and four papers on gleanings.

In 1862, he wrote one botanical and two chemical papers and one on gleanings; in 1863, one pharmaceutical, two chemical and one on gleanings; in 1864, two pharmaceutical, two chemical and one on gleanings; in 1865 and 1866, one chemical paper each year. In 1867, thirteen papers, seven of which were pharmaceutical; in 1868, one chemical, one botanical and three gleanings; in 1869, one pharmaceutical, one botanical and four gleanings; in 1870, his

first paper on pharmaceutical legislation appeared, and in connection with it two botanical papers, one chemical and three on gleanings; in 1871, fifteen contributions, seven of which were pharmaceutical; in 1872, twenty papers, twelve of which were on gleanings; in 1873, nineteen, twelve of which were on gleanings; in 1874, fourteen of which nine were on gleanings; in 1875, the same number, nine of which were on gleanings; in 1876, twenty contributions, eleven of which were on gleanings; in 1877, seventeen papers; in 1878, ten papers, four of which were botanical; in 1879, four papers; in 1880, two papers; in 1881, nineteen communications; in 1882, twenty-four papers, twenty of which were on gleanings; in 1883, twenty-four papers; in 1884, five papers; in 1885, twenty-five communications, of which nineteen were on materia medica subjects; in 1886, fourteen, twelve of which treated of botanical and materia medica subjects; in 1887, seven on materia medica subjects, one chemical and six on practical notes; in 1889, eight contributions; in 1890, twelve papers; in 1891, four papers, two of which were botanical; in 1892, three, two of which were botanical; in 1893, his last paper appears in the March number. It is entitled, "On the Tubers of *Dioscorea* Species."

In 1892, Prof. Maisch's friends noticed that at times he appeared to be suffering, and for the first time in many years he was occasionally compelled to relinquish some of his lectures. It was not, however, until April, 1893, that he experienced a difficulty in swallowing food. At first no one realized the significance of this symptom, and it was only after a considerable increase of this painful sensation that he sought medical advice. Gradually, but surely, the orifice of the œsophagus became smaller and smaller, and it was soon recognized that a malignant growth was pressing upon it to such an extent that solid food could no longer find an entrance into the stomach, and after five months of painful suffering, which he bore with fortitude and resignation, he peacefully passed away on the 10th of September, 1893. During the five months immediately preceding his death, he continued to perform every duty that he possibly could, whilst his faithful wife and children assisted him greatly by their devoted service. During the summer the approaching meeting of the American Pharmaceutical Association in Chicago, and the assembling of the International Congress at the same place were events that he had looked forward to with particular

interest. But when the month of August was reached, the progress of his disease was so great, that he was compelled to relinquish all idea of being present. The grief of his friends at these gatherings upon learning his condition was heartfelt and a most touching incident occurred when the President of the Pharmaceutical Society of Great Britain announced to the meeting that he was the bearer of the Hanbury Gold Medal which had been awarded to Prof. Maisch for distinguished services and for original research in the Natural History and Chemistry of Drugs. Fortunately, this testimonial reached him whilst he was in full possession of his faculties, although suffering severely. His face, wasted by the long-continued pain to which he had been subjected, lit up with a smile of pleasure when he received it, but a few short days before his earthly existence closed. A review of his eventful life teaches the invaluable lesson of persistent application in the face of what were apparently insuperable obstacles. His mind was imbued with a love for science, and the characteristic which thoroughly pervaded all of Prof. Maisch's work as a scientist, was the persistent search for truth, for he would never rest until he was satisfied that the utmost effort had been put forth to eliminate error, and it was the knowledge of this trait in his character which gave to his scientific opinions so much weight. Outspoken often to brusqueness in condemning error, his mind was always open to conviction, and he was never ashamed to change his views when convinced that they were not correct. Prof. Maisch had a profound love for the country of his adoption, and although he had lived in America forty-three years, no one could ever mistake his nationality; his strong, rugged features and the slight accent, which was never quite absent from his speech, at once proclaimed his German birth. Having decided to make America his home, he applied himself with all his powers towards developing the science which he had chosen for his life-work. It was no grudging service which he gave. Although loving his native country devotedly, he did not belong to the class who can find nothing in the country of their adoption to commend, but with rare wisdom and without sacrificing truth he believed he could accomplish more good and serve the best interests of all more devotedly by endeavoring to guide those who looked up to him as a leader in correct paths without denouncing them for their inability to realize his ideal. These convictions coupled with his stanch integrity, high sense of

honor and powerful intellect, had much to do with his success in strengthening his influence with his American brethren, and the heartfelt expressions of grief and regret which have been heard in every State of the Union attest the universal regard and esteem with which he was held. Truly, American Pharmacy has lost a master mind by the death of John Michael Maisch. J. P. R.

## NOTE ON RESIN OF PODOPHYLLUM, U. S. P.

GEORGE M. BERINGER, PH.G.

The object of the present note is not to add anything to the history or chemistry of this valuable remedy, but simply to correct the errors in the statement of its action to solvents that have been incorporated in the Pharmacopœia of 1890.

The errors appear to have originated in the National Dispensatory, which states in regard to resin of podophyllum: "It dissolves to a limited extent in carbon bisulphide. From 15 to 20 per cent. of the resin is soluble in ether and 80 per cent. is dissolved by boiling water and reprecipitated on cooling. A small portion of the resin, however, remains in solution in the water."

In 1889, I had occasion to examine two samples of commercial "*podophyllin*." The one was of a bright yellowish green color and yielded to ether 66 per cent. This evidently was not made in accordance with the pharmacopœial formula as it bore evidence of having been precipitated by solution of alum. The other sample appeared to conform with that made by the official process and yielded to ether 81 per cent. At the time, the attention of Professor Maisch was called to the evident misstatement in his book. He frankly stated that evidently it was a mistake and that the word *soluble* in relation to the action of ether should be *insoluble* and, it is in the knowledge of the writer, that in the edition now in press he had made the correction.

We are surprised to find this error reiterated in the new Pharmacopœia, where on p. 338 occurs the following unequivocal statement: "Ether dissolves 15 to 20 per cent. of it; boiling water dissolves about 80 per cent., and deposits most of it again on cooling." The object of this note is to prove that both of these statements are erroneous.

Upon referring to the literature of this subject we are confused by

the varying results reported by different investigators. After making due allowance for the fact that these writers working with rhizome collected at different times and seasons of growth would obtain products showing necessarily variation in the percentage and composition of the resin, there are still a number of statements that cannot be made to coincide with our present knowledge. While we are inclined to believe, notably from the experiments reported by Tilden (*Proceedings American Pharmaceutical Association*, 1859, p. 334), that the correct time for collection of podophyllum is in the autumn, as the percentage of resin and of ether soluble resin appears then to be the larger, the *Pharmacopœia* does not mention the proper time for collection. It is a matter of regret that, up to the present time, no systematic experiments have been carried out to decide the variation in the composition of the rhizome as collected at different seasons.

It was deemed advisable to prepare a fresh sample of resin of podophyllum to test these statements of the *Pharmacopœia* and 1,000 gm. of podophyllum was treated strictly in accordance with the official directions. It yielded 39 gm. of resin having a greenish-brown color, with a slight tinge of yellow. This yield, 3.9 per cent., is somewhat less than that reported by some writers, but is believed to be in harmony with the results reported by the most reliable investigators.

It exhibited the following solubilities: Ether (U. S. P., 1890), extracted 82 per cent. Chloroform extracted 70 per cent. Alcohol, methyl alcohol and amyl alcohol readily dissolve it. Solutions of the caustic alkalies dissolve it with but a slight residue. Acetic acid, U. S. P., dissolves it but partly, but the glacial acetic acid readily dissolves it entirely. Carbon disulphide partly dissolves it. Benzin and benzol each dissolve but a minute trace, about one-half of one per cent., mostly yellow coloring matter. It is insoluble in turpentine. Boiling water takes up about 22 per cent., and deposits most of this again on cooling.

Concerning the solubility of resin of podophyllum in ether, investigators report as follows: John W. Cadbury (*Amer. Journ. of Pharm.*, 1858, p. 301), 77 per cent.; this resin being precipitated by non-acidulated water. Harvey Allen (*Amer. Journ. of Pharm.*, 1859, p. 206), of resin of his own preparation, 80 per cent. was soluble in ether, of a purchased sample 75 per cent. Tilden (*Proceedings*



Amer. Pharm. Assoc., 1859, p. 334), the resin prepared from rhizome collected in the spring, 52 per cent. was soluble in ether and of that prepared from autumn collection 96 per cent. Wm. G. Parrish (Amer. Journ. of Pharm., 1860, p. 208) reported 85 per cent. C. Bullock (Amer. Journ. of Pharm., 1862, p. 144) states that sample of resin prepared by Merrill & Co., 63 per cent. was soluble in ether. F. B. Power (Amer. Journ. of Pharm., 1874, p. 227) reports for his own make 92 per cent. soluble in ether, purchased samples 59 to 86 per cent. The same author, in a later paper (Proceedings Amer. Pharm. Assoc., 1877, p. 432), writes, "Of the purified officinal resin, 82 per cent. was found to be soluble in ether of spec. grav. 0.720, at 22° C." My own sample exhibits 82 per cent. While the figures above quoted show considerable variation, they prove, without doubt, that properly prepared resin of podophyllum yields to ether about 80 per cent., and not 15 or 20 per cent., as stated by the Pharmacopœia.

Regarding its solubility in water, Professor J. M. Maisch writes, (Amer. Journ. of Pharmacy, 1874, p. 231), "A comparatively small amount of the officinal resin appeared to be insoluble in hot water, but its percentage was not ascertained." This statement is not in accordance with my observations. Cadbury (loc. cit.) states, "Water alone, either hot or cold, did not dissolve any, nor do the dilute acids, nor oil of turpentine hold it in solution." Dr. H. Pursell, in a paper before the Pennsylvania Pharmaceutical Association, in 1881 (Amer. Journ. of Pharm., 1881, p. 377), says, "On heating the resin with 3 parts of water at 150° F. 4 per cent. of extract, soluble in water, was obtained."

On the other hand, F. B. Power (Proceed. Amer. Pharm. Assoc., 1877, p. 431) aims to confirm the statement of Maisch, and writes as follows: "To ascertain the extent of the solubility of the resin in boiling water, one gram of the resin was placed in a flask with distilled water upon the water-bath: the resin soon softens to a brownish mass, while the water assumes a bright amber color, perfectly transparent while hot, but becoming turbid upon cooling and gradually depositing portions of flocculent yellowish resin; the water was thus successively decanted and renewed with fresh portions, the operation being continued for many days, until the water became no longer appreciably colored. The writer succeeded in dissolving 80 per cent. of the purified resin by this treatment, the undissolved por-

tion being, when dry, of a very dark brown color, and is but partially soluble in ether, sp. gr. 0.720, which proves the correctness of Professor Maisch's supposition, and that the active portion of the officinal resin is almost entirely soluble in hot water."

The above citations evidently constitute the authority for the official statement regarding the solubility of this resin in water, but it certainly cannot be seriously contended that the method adopted, heating in a flask with successive portions of water for days, would yield accurate determinations of the solubility of a product of varying composition and subject to change.

In my experiments one gramme of resin was treated with 100 cc. of boiling water for ten minutes, the water then decanted from the fused resin and evaporated. The residue weighed .227 gm. A second determination yielded .230 gm. These results are so close as to be comparable and prove their substantial accuracy, and it is believed they represent the true solubility of resin of podophyllum in water.

Another discrepancy appears in the solvent action of chloroform, as stated by Mr. F. B. Power (*American Journal of Pharmacy*, 1874, 231), where 5 gm. of resin is stated to yield to chloroform only 0.02 gm. This is most likely an error, as immediately beneath on the same page the writer states that 2 gm. of the ether soluble resin yielded to chloroform 1.4. This would amount to nearly 65 per cent. of the resin coinciding fairly well with my results, 70 per cent. The solubility in chloroform of the medicinally active constituents of the resin has likewise been taken advantage of in the process of assay generally proposed.

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## THE UNITED STATES PHARMACOPŒIA OF 1890.

BY GEORGE M. BERINGER, A.M., PH.G.

[Continued from vol. xxiii, p. 602.]

Volatile Oil of *Betula* is introduced to distinguish between the true oil of wintergreen and what is generally sold as such. The statement unnecessarily introduced in the official definition that "it is identical with methyl salicylate" is seriously disputed. We are aware that the manufacturers of methyl salicylate make this claim which has been questioned by disinterested chemists who proposed a distinguishing test. It is to be hoped that some unprejudiced chem-

ist will reinvestigate the subject thoroughly so as to settle the mooted question.

Oil of Ceylon Cinnamon is no longer official. The Pharmacopœia now describes Oil of Cinnamon as "a volatile oil from *Cassia cinnamon*" which implies that it is distilled from the bark. According to Messrs. Schimmel & Co. the bark yields but 1.5 per cent. of oil, having a sp. gr. 1.035, this as well as price precludes its use for this purpose. From their investigations they state, "It can, therefore, be assumed with safety, that the cassia oil of commerce is distilled in China out of the leaves, leafstalks and young twigs of the cassia plant, probably together with various refuse products worthless for other purpose."—(Semi-Annual Report Schimmel & Co., Oct., 1892, p. 14.)

Hirschsohn's alcoholic lead acetate test is adopted for detecting colophony. The character of the residue left on evaporation is a simple test that should have been given, as it yields valuable information as to the character of adulterants. The quantitative estimation of cinnamic aldehyde is likewise one of the surest tests of quality and is not very difficult to apply.

Oil of Copaiba is stated to be soluble in about 10 times its volume of alcohol and not an equal weight, as erroneously stated in 1880. My own notes show that freshly distilled oil is soluble in from 6 to 8 volumes of alcohol, but solubility varies with age, as oils a year or so old require from 10 to 15 volumes.

Oil of Pennyroyal, it should be remembered, is only the American oil distilled from *hedeoma*. The closely allied Austrian and Spanish oils obtained from *Mentha pulegium*, L., are frequently seen in commerce.

The sp. gr. of Oil of Peppermint is stated at .900 to .920. Pure oil generally averages .910 and the range .908 to .917 has been found as fixing the limits. The statement that "the oil does not fulminate with iodine," would be correct if changed to "*should not* fulminate with iodine," as old oil or one exposed to oxidation will fume with iodine more or less.

The nitric acid test, proposed by A. B. Stevens, is adopted to detect the adulteration of this and other oils with oil of camphor. A test that will readily detect oil of copaiba in this and other oils is needed.

The sp. gr. of Oil of Sandal Wood is stated at 0.970 to 0.978. This

is too limited. Peter MacEwen reports for an Indian oil 0.989 and recommended that the official British Pharmacopœia figures be changed to 0.970 to 0.990. Mr. Holmes had previously reported for museum specimens 0.9901 (*Amer. Journal of Pharmacy*, 1886, p. 254.) Dodge and Olcott report (*Druggists' Circular*, 1889, p. 84): "We find the bulked result of a distillation to be 0.970 at 60° F. The first of the run is of a light color and weighs 0.960 at 60° F., and on account of its flowery odor is especially adapted for perfumery use. The last of the run is dark and weighs .980 at 60°." I have examined American distilled oil, showing a gravity of 0.9809. The East Indian oil distilled in crude apparatus would of course show a higher gravity and the figures proposed by MacEwen would include this native oil.

The official test solubility in mixture of alcohol and water (3-1) is not always reliable for detecting the common adulterant, oil of cedar. E. M. Holmes (*loc. cit.*, p. 262) concludes that the admixture of cedar oil with sandal oil to the extent of 10 per cent. is not easily detected by the reduced solubility in alcohol. My own experiments in this direction were likewise unsatisfactory. I have found the ammonio-copper solution test, proposed by M. Durand (see Braunt, "Fats and Oils," pp. 540-541), to give satisfactory results in detecting easily 3 to 5 per cent. of cedar oil. This test appears to have been overlooked by all the recent investigators, although claimed by the author to detect  $\frac{1}{10}$  of one per cent. of the adulterant. Almost all of the so-called West Indian sandal wood oil in the American market is not the oil described by Holmes as obtained from an undetermined species of Rutaceæ, but is really a mixture of East Indian sandal wood oil and oils of cedar and copaiba.

In the preparation of Phosphorated Oil, I would suggest the use of chloroform in place of ether as being a much better solvent of phosphorus.

Oil of Turpentine should be accompanied by specific tests for benzoin.

While the morphine strength of Opium remains at not less than 9 per cent., that of powdered opium is rightly limited to not less than 13 nor more than 15 per cent. The Pharmacopœia, 1880, admitted powdered opium of from 12 to 16 per cent. morphine, which permitted too great a variation in the strength of the pharma-

ceutical preparations. Neither the percentage of water allowable in opium nor the yield of extract is given.

The introduction of Pepsin is accompanied by an official description sufficiently elastic to admit all the varieties of pepsin in the market, providing that they possess the required digestive value. There is a lack of definiteness in a product that may be either "white, yellowish-white, pale yellow, or yellowish;" may be either "an amorphous powder, grains or scales;" may be either "soluble or only partly soluble," and may be "opaque or translucent." Would it not have been more in accordance with pharmacopœial exactness to have introduced two pepsins, one in powder, the so-called insoluble, and the other in grains or scales, the so-called soluble? The properties of each could have been definitely fixed and the former directed for preparing the saccharated pepsin and dispensing in powders, the latter for solutions. The statement in the assay process that "100 cc. of the liquid will contain 0.2 cc. of absolute hydrochloric acid and 0.00335 gm. of the pepsin to be tested and 98 cc. of water" is a self-apparent error, as necessarily there must be somewhat more than 98 cc. of water.

The use of the various purified liquid petroleum products so largely introduced as proprietary articles has necessitated the official recognition of a Liquid Petrolatum. There is too much variation allowable in the official description of color and gravity of this product. The requirements of the Pharmacopœia Germanica for paraffinum liquidum ("without color, clear, non-fluorescent, \* \* \* about .880 sp. gr.") should have been adopted. The statement that it is "readily soluble in fixed oils" must be questioned as it is nearly insoluble in castor oil.

The two terms Soft Petrolatum and Hard Petrolatum replace the Petrolatum of 1880. This change, I presume, has been made to define the products suitable for different climates and uses. Fluorescence in these products is due to impurities remaining and is an indication of the degree of purification the product has been subjected to. I would suggest that in the official description "more or less fluorescent" should be changed to "nearly or quite free from fluorescence." The melting point is given for the soft at 40° to 45° C. and for the hard 45° to 51°, so that there is an intermediate melting point, 45°, where the petrolatum may be either hard or soft. The melting point for the hard petrolatum should be 48° to 52° C.

(118.4° F. to 125.6° F.) The official description of Jaborandi intended to cover both Rio Janeiro and Pernambuco Jaborandi does not agree with E. M. Holmes' description of the latter variety. The official description reads "*4 to 6 cm. broad, oval or ovate oblong*; Holmes (loc. cit.) writes *2½ to 5 cm. broad, narrowly elliptical*. The description should also describe the prominent veinlets on the upper surface.

Two pills, namely, *Pilulæ Galbani Compositæ* and *Pilulæ Ferri Compositæ* have been dismissed, and two, namely, *Pilulæ Catharticæ Vegetabilis* and *Pilulæ Ferri Carbonatis* (Blaud's pills) have been added to the official list.

Castor oil is directed as the excipient for Compound Pills of Antimony. In Compound Cathartic Pills, extract of jalap is again directed, but it is to be noted that the proportion of the ingredients has been changed so that now the official pills weigh each .185 gm. In 1880, the weight was .230 gm., and in 1870 .231 gm.

In the formula for Pills of Ferrous Carbonate, the quantity of potassium carbonate directed is insufficient to decompose the quantity of ferrous sulphate directed even if an anhydrous pure carbonate of potassium is used. These pills should have been directed to be coated with an ethereal solution of tolu, as a protection against oxidation, and then the requirement that they should be freshly prepared when wanted could have been omitted.

In the formula for Pills of Phosphorus the althea and acacia have been increased so that each pill, when finished, will weigh .120 gm. (nearly 2 grains), unnecessarily large for a pill containing only .0006 gm.,  $\frac{1}{100}$  grain phosphorus. The manufacturers will hardly dare to adopt this formula.

Lead Nitrate is so little used that it might have been dropped.

Potassium Carbonate is now directed to be anhydrous, and to contain not less than 95 per cent. of the pure salt. This excludes the commercial purified carbonate or salt of tartar, which generally contains 18 per cent. of water, about 3 molecules. Prune should be the *dried* fruit of *Prunus domestica*, L.

In *Pulvis Glycyrrhizæ Compositum*, the substitution of oil of fennel for the pulverized fruit is to be noted. We see no reason for changing this formula from that original in the German Pharmacopœia.

In the description of *Pyrethrum* it should have been noted that

the crown of the root usually contains tufts of hair from the base of the pubescent stem.

The solubility of Resin of Podophyllum is erroneously stated on p. 338.<sup>1</sup> On p. 340, Pale Rose is stated to be an ingredient in Syrupus Sarsaparillæ Compositus, but it is not mentioned in the formula given for this preparation; as it has no other use it might have been omitted.

Sugar of Milk should be accompanied by tests for such adulterants as starch and glucose, and should be required to be free from fat and casein. The tests should likewise state the percentage of ash allowable, and supply other tests for inorganic salts apt to be present from the water used in its preparation.

In order to insure uniformity of product, the formula for Sapo Mollis should require a definite yield of product.

Scutellaria is stated to be 50 cm. long; most of that in the market will be 20 to 25 cm. and broken. We are again told on p. 349 that argel leaves "are frequently present" in Alexandria Senna, and a description is attached to detect this adulterant. For ten years past the writer has been examining commercial senna for this adulterant, but has not yet been successful in finding it.

Tests are wanted for detecting chloride and bromide in Sodium Iodide. Sodium Nitrate is not sufficiently used to be retained.

Sodium Nitrite is a new addition, introduced as the source of nitrogen dioxide in the new official process for spirit of nitrous ether. It is required to contain not less than 97.6 per cent. of the pure salt a degree of purity hard to obtain in the commercial salt. The price at which the chemically pure salt is now sold, \$2.50 to \$3 per kilo, precludes its use for this purpose. The commercial article prepared for the use of the dyer while not attaining the official purity will probably be found to answer. It is likely, however, to be contaminated with both lead and arsenic.

To the official Spirits there are four additions, Spirit of Bitter Almond, Compound Spirit of Orange, Spirit of Glonoin and Spirit of Phosphorus, and one dismissal, Perfumed Spirit or Cologne Water of 1880. Spirit of Nitrous Ether is required to yield when assayed by the nitrometer method 4 per cent. of pure ethyl nitrite. The process for the manufacture of this spirit is again changed;

<sup>1</sup> Experiments by the writer to decide this point are not completed, but will be reported later.

sodium nitrite, alcohol and sulphuric acid being distilled to yield the ether; which after washing and dehydrating is dissolved in 22 times its weight of alcohol. In the formula 770 gm. sodium nitrite is directed to be dissolved in 1,000 cc. water, heat not being directed. This salt is stated to require 1.5 parts of water for solution and this would necessitate increasing the amount of water directed.

The ammoniacal strength of Aromatic Spirit of Ammonia is reduced and oil of nutmeg is again directed replacing the oil of pimenta of 1880. The solution of the ammonium carbonate in the ammonia water and water should be directed to remain in the closed flask for 24 hours to insure the conversion of the acid carbonate into the normal carbonate and leaving less free alkali to react on the essential oils and darken the solution.

In Spirit of Orange the synonym, "essence of orange" should be given; oil of *sweet* orange peel should be specified and 50 gm. orange peel grated from the fresh ripe fruit should be added. In Compound Spirit of Orange, oil of *bitter* orange peel should be specified. In Spirit of Camphor, water is omitted, alcohol alone being the solvent. At least 10 per cent. of water should have been directed. The addition of a small amount of water seems to bring out the pungency of the camphor. Spirits of Gaultheria, Juniper, Juniper Compound, Lavender and Nutmeg have all been increased in strength.

Strophanthus is stated to be nearly inodorous, this is hardly accurate as a very disagreeable odor is obtained on crushing the seed.

Strychnine Sulphate is stated to contain 5 molecules of water, whereas in 1880 it was recognized as containing 7 molecules. As this would materially affect the strength of such a potent remedy as well as its physical properties, solubility, etc., it is interesting to know which formula corresponds with the present commercial article.

The Pharmacopœia is careful to specify both the shape and weight of the various suppositories. The rectal suppository is directed to be 1 gm. as in 1880. In many cases this has proven too small except for infants. The 2 gm. size is preferable. The vaginal suppository is directed to be *globular*, and about 3 gm. in weight. Six gm. is preferable, especially where large quantities of such articles as boric acid and iodoform are directed as has become customary.



I see no reason why the official directions should not order that the medicinal ingredients be incorporated with all the cacao butter, it being grated and added in portions, and the resulting mass melted on a water-bath, and poured into moulds as melted.

It is to be observed that in Suppositories of Glycerin the formula directs 68 gm. "to make ten rectal suppositories." There will be some loss of water, of course, in the preparation. A trial of this formula yielded 65 gm.; but this would yield suppositories of 6.5 gm. each, if made into *ten suppositories*, as directed. On the other hand, one gramme rectal suppositories of glycerin are too small except for infants. These, as generally supplied, are from 2 gm. to 2.5 gm. each. The direction that they should be freshly prepared when required is unnecessary and impractical. The permanence of glycerin suppositories is a practical test of their quality.

The process of cold percolation is for the first time officially applied to the preparation of syrups.

The exact instructions for carrying out this process, given under Syrupus, on p. 387, should be sufficient for all intelligent pharmacists, and there should be no necessity for a repetition of the instruction in each of the other ten syrups in which this process is officially permitted. The statement that the solution of the sugar may also be effected by the process of percolation as described on p. 387 would be sufficient.

The formula of 1880 for Syrup of Acacia is maintained, with the exception that the mucilage of acacia is directed to be recently prepared. The mucilage itself is very prone to decomposition. It is regretted that the formula of the 1870 Pharmacopœia, which yielded an excellent preparation, that properly kept remained unaltered for some time, was not again introduced.

In Syrup of Citric Acid the amount of spirit of lemon is greatly increased, making the preparation correspond more nearly to the lemon syrup, dismissed.

The formula for Syrup of Hydriodic Acid of the Pharmacopœia of 1880 is discarded, and the process of the National Formulary is introduced. In the official formula the quantity of tartaric acid directed, 12 gm., is insufficient to decompose both the potassium iodide and potassium hypophosphite directed and necessarily a portion must remain undecomposed in the product. To ensure entire decomposition 13.19 gm. would be required. The tartaric acid

should be directed to be *crystals* as the experience of the writer is that the *commercial* powdered acid when used in this preparation causes liberation of iodine. The use of hypophosphite of potassium as a preservative is unnecessary, provided a small amount of sugar is added to the acid solution before filtering. The official directions to evaporate the solution on a water-bath, and when cold to mix with syrup is likely to result in decomposition of the hydriodic acid; why not direct the acid solution to be filtered into sugar and a sufficient quantity of distilled water added and the sugar dissolved by agitation? In the report of the Pharmacopœia Committee of the Philadelphia College of Pharmacy, submitted to the National Convention, will be found a formula containing these suggestions. To test this formula samples have been preserved for over a year, and in one instance for over three years, with satisfactory results. The addition of a small amount of spirit of orange would improve this syrup and give it distinguishing character.

The addition of both alcohol and glycerin in the formula for Syrup of Althæa is endorsed and will render this a more stable preparation than it has been in the past.

The directions for preparing Syrup of Almond is sadly erroneous, and we can only conjecture what the intention was. In the formula, 200 cc. of water is directed and quantity sufficient of syrup to make 1,000 cc.; but in the instructions 330 cc. of water is used, and then in addition *water* to make the product measure 1,000 cc. For the latter, syrup evidently was intended.

In Syrup of Orange, the orange peel cut into shreds is boiled with alcohol for 5 minutes and after cooling the tincture expressed. Macerating the orange peel, *grated* from the fruit, with the alcohol for 2 or 3 days without heat, and then expressing and washing the residue with sufficient alcohol would be preferable.

In Syrup of Calcium Lactophosphate the salt is directed to be prepared by dissolving the calcium carbonate in lactic acid and adding phosphoric acid. There is a decided excess of acid directed. Stronger orange flower water should be directed and was most likely intended as the quantity directed to be used is much less than that ordered in 1880.

The saccharine strength of Syrup of Ferrous Iodide is now less than 50 per cent. instead of 60 per cent. in 1880, and syrup is used instead of sugar, the boiling ferrous iodide solution is filtered into

the syrup which is not directed to be warmed previously, otherwise the process is identical with that of the Pharmacopœia of 1870.

Syrup of Hypophosphites now contains a small amount of hypophosphorous acid in place of the citric acid of the 1880 edition. The quantity of sugar directed should be increased to 600 gm. In Syrup of Hypophosphites with Iron, ferrous lactate is retained, but is directed to be dissolved by aid of potassium citrate; ferric hypophosphite should have been directed, making all the metallic salts used hypophosphites.

The addition of acetic acid and glycerin to Syrup of Ipecac is a decided improvement.

It is a question if in the new official formula for Syrup of Lactucarium the valuable portion is not precipitated by the water, and allowed to remain with the calcium phosphate on the filter? With the present official tincture of lactucarium a syrup, yielding but a small amount of precipitate on standing, can be made by the following formula: tincture of lactucarium 100 cc., glycerin 100 cc., syrup 800 cc., mix the tincture with the glycerin and add the syrup to the mixture.

In Syrup of Wild Cherry the glycerin is greatly increased, and is now part of the menstruum and not added to the percolate. We cannot approve this formula, as the resulting syrup is more remarkable for astringency than flavor.

Syrup of Rhubarb is a decided improvement over the formula of 1870, and yields a more stable preparation.

In Compound Syrup of Sarsaparilla the suggestion of Oldberg to omit both the guaiac wood and pale rose has been adopted, and oils of sassafras and gaultheria have again taken the place of their respective drugs directed in the Pharmacopœia of 1880. The use of fluid extracts of sarsaparilla, glycyrrhiza and senna in the preparation of this syrup is another innovation.

For preparing Syrup of Senna, Alexandria senna only is rightly directed to be used. In the direction for this preparation we are instructed to prepare 600 cc. of infusion. "Strain this, and, when it is cold, mix it with the alcohol (150 cc.) in which the oil of coriander (5 cc.) has previously been dissolved. Set it aside until the precipitate has subsided, then pour off the clear liquid, filter the remainder, and pass enough water through the filter to obtain 550 cc." It is to be noted that 755 cc. of liquid is to be filtered, and the fil-

trate to be *made up to 550 cc.* by washing the precipitate. The precipitate cannot occupy the space of 255 cc. of the liquid. The 600 cc. of infusion should be directed to be evaporated to 400 cc., and then the alcohol and oil of coriander added and the process continued as in the official direction.

The tinctures as a class show a decided improvement. With but one exception, and that, most likely unintentional, the formulas are given for the uniform quantity of 1 liter of product. In Tincture of Aconite the suggestion of Tscheppe to reduce the alcoholic strength of the menstruum has been accepted and 7 vols. alcohol, 3 vols. water now are directed in place of alcohol of the previous edition.

In Tincture of Aloes, liquorice root is now directed in place of the extract and percolation is ordered instead of maceration. Liquorice root is likewise added to the Tincture of Aloes and Myrrh, an unnecessary addition. I would prefer maceration to percolation in both of these tinctures.

In Tincture of Arnica the arnica flowers in No. 20 powder are to be packed into a cylindrical percolator, *without* previous *moistening*. We cannot see why this exception should be made to the generally adopted rule of moistening the powder before packing.

The adoption of alcohol in place of diluted alcohol for Tincture of Calendula is a change that cannot be approved. Diluted alcohol even of the strength of the Pharmacopœia of 1880 extracted this drug and yielded a permanent tincture. The use to which this preparation is generally applied, namely, external application to wounds, bruises, etc., makes strong alcohol undesirable as the menstruum.

The Pharmacopœia of 1880 reduced the strength of Tincture of Indian Cannabis and it now suffers another reduction of nearly 5 per cent. in the amount of the drug used, equivalent to a reduction of nearly 25 per cent. in strength.

Tincture of Cinnamon is now to be made from the Ceylon cinnamon and contains 5 per cent. by volume of glycerin.

In Tincture of Cubebs the menstruum becomes alcohol in place of diluted alcohol and the drug strength is doubled. Both of these are good changes.

In the formula given for Tinctures of Fresh Herbs, the amount of product to be obtained is not stated. This would vary with the amount of moisture present in the various herbs. It evidently was the intention to direct that the so-called 50 per cent. tincture should

be obtained, that is 50 gm. of the fresh drug to be represented by 100 cc. of the finished tincture. In order to attain this object but 900 cc. of alcohol should be directed to be used in the maceration and then the residue after expression and the filter washed with sufficient alcohol to obtain 1,000 cc. of tincture.

The increase in alcoholic strength of the menstruum used for Tincture of Galls and the reduction in that directed for Tincture of Gel-semium are both good changes.

In the Compound Tincture of Gentian, it is to be noted that the amount of Cardamom has been reduced one-half. We doubt if too much aromatic material could be introduced in this preparation.

Tincture of Lactucarium is introduced solely for the purpose of making therefrom the syrup. As a substitute for the unsatisfactory and difficult to prepare fluid extract of 1880, it is a welcome addition.

Elsewhere, the writer has called attention to the impossibility of preparing Tincture of Musk, containing 10 per cent. of musk, as directed by the Pharmacopœia of 1880, and attempted to prove that even in a tincture containing 2 per cent. of pure musk it was not completely extracted. In the new edition, the first proposition appears to be recognized, and now the tincture is directed to be made 50 gm. in 1,000 cc., about 5 per cent. To have made it 2 per cent. would have brought it in harmony with the German Pharmacopœia and as strong as a tincture of *pure musk* can be made.

If the official directions for preparing Tincture of Nux Vomica are followed, using only extract of nux vomica corresponding to the official requirements, an active remedy must result. In future, tincture of nux vomica from all sources should be uniform.

The formula for Tincture of Opium is likewise excellent, and with the morphine strength of powdered opium, as limited by the Pharmacopœia, there remains no excuse for the want of uniformity in this preparation as supplied by different pharmacists.

Tinctures of Physostigma and Stramonium Seed have been increased nearly 50 per cent. in strength, there now being 150 gm. of the drug in 1,000 cc., instead of 10 per cent. This strength has been adopted for many of the tinctures of poisonous drugs.

Tincture of Quillaia is a new addition, being a concentrated decoction, with the addition of 35 per cent. by volume of alcohol as a preservative.

For Tincture of Rhubarb, a menstruum containing 60 per cent. of alcohol by volume and 10 per cent. of glycerin, has been adopted, and percolation completed with alcohol 60 volumes, water 30 volumes. For Aromatic Tincture of Rhubarb and for Sweet Tincture of Rhubarb the menstruum contains 50 per cent. by volume of alcohol and 10 per cent. of glycerin, and percolation is continued with diluted alcohol. The amount of glycerin is excessive, and we see no reason why the same menstruum should not have been adopted for all three, especially as the former contains less aromatic material.

The introduction of acetic acid in preparing Tincture of Sanguinaria is good. Acetic acid appears to be peculiarly adapted for extracting this drug.

The menstruum from Tincture of Squill now becomes the same as that for the fluid extract, being 3 vols. alcohol, 1 vol. water.

Tincture of Strophanthus is one of the newer remedies that has merited recognition by the Pharmacopœia. It is regretted that in the official formula no instructions are given for removing the oil from the powdered seed before percolation. This oil of an exceedingly disagreeable character, will average 30 per cent. of the weight of the seed and is easily removed by ether or purified benzin or even largely removed as directed in the German Pharmacopœia by expression. By the use of a weaker alcoholic menstruum than that originally proposed for this preparation, the Pharmacopœia evidently aims to diminish the amount of oil extracted. The alcoholic strength of the menstruum adopted, 65 per cent. of alcohol, U. S. P., by volume corresponds closely to the diluted alcohol adopted in the German Pharmacopœia (68 per cent. by vol. Ph. G.)

Tincture of Sumbul remains 10 per cent. sumbul, while the alcoholic strength of menstruum is reduced. This tincture is too weak to be very active. It should contain at least 25 per cent. of the drug or be entirely dismissed and a fluid extract of sumbul introduced.

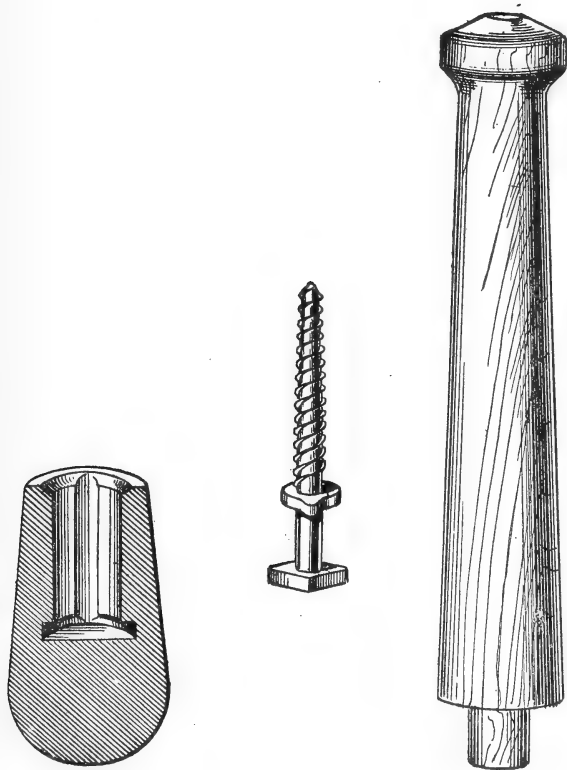
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## AN IMPROVED PESTLE.

BY I. J. WHITE, PH.G.

The annoyance and inconvenience druggists have had for many years in the use of the old style wax-jointed pestle has been overcome by the use of a pestle made as below described. In this the

wedgewood head has two vertical grooves, of which the cut shows one, running down on opposite sides to a countersunk groove at right angles to the other two. This groove runs around on the inside at about half the height of the head, and is just large enough to permit of the complete turning of the head of the screw. The shank is oval, and has a sliding nut, which falls into the grooves in the pestle head when the screw has been turned sufficiently. The



PATENT APPLIED FOR.

nut when in place prevents the turning of the screw. The oak handle is tapped out to receive the screw, and has a projection which fits into a circular opening in the pestle head, thereby making the joint more stable. In joining the head and the handle the sliding nut must be lifted up and placed at right angles to the screw head. The screw is then placed over the wedgewood head, so that the angles on the head of the screw come in line with the grooves

in the pestle head, it is then pushed down to the bottom, given half a turn, when the sliding nut falls into the grooves. The head pulling on the horizontal groove prevents the falling out of the screw. The handle is then screwed on, which thus completes the pestle. A patent has been applied for the contrivance. The pestle will be placed on the market at or very near the cost of the old style pestle.

## PHARMACOPŒIAL NOMENCLATURE.<sup>1</sup>

DR. E. BILTZ, ERFURT.

The programme of the International Pharmaceutical Congress, to be held in Chicago in 1893, which I have before me, divides the subjects for discussion into four sections, and submits for deliberation under Section 3 the so-called Pharmacopœial Questions. In reply to No. 23:

What improvements, if any, are desirable and practicable in pharmacopœial nomenclature? Is a near approach to uniformity possible?

I beg leave to submit the following:

The object of the pharmacopœial nomenclature is, as is well known, to give to the various medicaments titles *as correct* as the requirements of the scientific standing of pharmacy on the one hand, and the objects of the medical profession on the other, would seem to indicate; they should be *scientifically correct*, and secondly, *practicable*—that is, *easy of application, comprehensible*, and, above all, *concise*.

The pharmacopœias of all nations give proof of the frequency of difficulties met with in endeavoring to unite these two points of view, forcing the authors of a pharmacopœia to one-sided decisions, and the question in this connection is, above all, what success has been scored by the one or the other of the above-named objects, and also which names have received not only popular approval, but also the sanction of custom or the approval of the medical profession. The entire proposition can be expressed in a few words by the question, *What must be the object in the naming of medicaments?* and the answer, *the greatest possible immunity from danger* in the treatment of disease by the combined responsibility of the physician and the apothecary through the *proper compilation* and the *correct under-*

<sup>1</sup> Read at the International Pharmaceutical Congress, at Chicago.



*standing* of physicians' prescriptions, and, above all, through the international use of like-sounding names for the medicaments.

There can be no doubt that the proper naming of medicaments is a subject of great importance, and that, for the sake of convenience and safety (that is, the avoidance of waste of time and of errors), the name selected should be :

- (1) *As short as possible*, or, in other words, easy of application.
- (2) *Permanent*, or, in other words, not changing with every new theory.
- (3) *As comprehensible* as possible, above all unembellished.
- (4) *Well-known* and *familiar through usage*.

Of course, scientific names should have the preference, providing they conform to all the requirements ; beyond that the *only* weight given to science should be that the name to be chosen expresses nothing which is scientifically false. For all attempts to give an idea of the chemical composition of the medicaments by a name which did not accord with the above four conditions have been futile, and totally ignored in practice ; the name could be found in the pharmacopœias, but never on prescriptions. However, a pharmacopœia must serve actualities, and the language customary between physician and apothecary, based on *materia medica*, must be one of easy fluency.

The result of this argument is that in the compilation of a pharmacopœia, as regards the nomenclature, all stiffness must be avoided, and a *compromise* made, for the benefit of both the medical and the pharmaceutical professions, *which gives proper weight to both science and practice* in the right place, and which, while giving no room to the objection of being unscientific, deserves all the praise of universal practicability.

It will, perhaps, be desirable to exemplify what has been said, and thereby give some hints which might be of service in the future.

First, as an example of the eminent value of brevity and general familiarity of a name, even when that name is not adaptable as a title in the Pharmacopœia, but, nevertheless, carries with it the convincing force of brevity and familiarity, and thereby vouches also for the greatest safety ; the name "sublimate," as it is used in the medical-pharmaceutical language. To whom would the thought come, at the mention of this name, that a sublimated body is meant

which, from this very use of this name is liable to be confounded with the chemically closely allied "calomel" (as this is also a sublimate), and in this form is even the true original medicinal calomel? But every one would at once remember that the word indicates the poisonous mercuric chloride, and would be so understood over the whole civilized world.

As I have said, I would of course not think of suggesting this name as a title for mercuric chloride, as scientifically it lacks diagnostic character; but I know of no other example which would show in a more convincing manner the value of brevity and the force lying in *usus tyrannus*, which cannot be over-estimated. And with this in view I recommend the adoption of such names as the following:

*Alumen* for *Potassii et Aluminii Sulfas*.

*Borax* for *Sodii Biboras*.

*Cerussa* for *Plumbi Subcarbonas*.

*Kermes* for *Antimonii Oxysulfidum*.

*Tartarus* for *Potassii Bitartras*.

*Tartarus ammoniatus*, *natronatus*, *ferratus*, *stibiatus*, for the well-known compound names, which, in spite of the greatest endeavor, could not be brought into general use. And if this suggestion should find no favor, they might, at least, be entered in alphabetical order, not only in the index, but also in the text, as, for instance, *Alumen*, *vide* *Potassii et Aluminii Sulfas*, etc.; for by their explicitness, brevity and long use, they have won for themselves an incontestable position in the medical language which cannot be denied them by any law.

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I will make my next proposition interrogatory: By what title should substances such as *Gummi Arabicum*, *Radix Scillæ*, or *Folia Coca*, etc., be entered?

In the beginning of the present century the rule was adopted by the *Pharmacopœia gallica*, *bavarica*, *saxonica*, and *borussica*, iv., to give, in the case of medicaments derived from the vegetable kingdom, the name of the botanical source, as, for instance, *Arnicae flores*, *Arnicae radix*, and, indeed, upon the suggestion of *Link*, who was one of the most prominent teachers in medical pharmaceutical schools of the present century, it was decided, in cases where there was a difference between the *official* botanical name and the *system-*

*atic* one, to give the former the preference. By this means the classification was simplified in such cases where officinal parts of plants were derived from various species of the same natural order, as, for instance, in the case of *Artemisia* (*A. Absinthium*, *A. Abrotanum*, *A. vulgaris*, *A. Dracunculus*). Later on, however, this rule fell into disuse again, preference being given to the old-established custom of grouping according to *Flores*, *Herbæ*, *Radices*, etc., until in more recent times these groups were again subdivided upon a scientific basis (the flowers into *flores* and *petala*, the herbs into *folia*, *herbæ*, and *summitates*, the roots into *radix*, *rhizoma*, *bulbus*, and *tuber*), and the various parts of plants were again very much scattered in the *alphabet* of the Pharmacopœia. This fact would justify the re-adoption of that first-named rule, providing the utmost care is taken not to give *too great a generalization* and thereby complicate matters, especially for the physician, who is rarely thoroughly at home in the field of systematic botany; indeed, there are cases where the pharmacist would not know for the instant, what to look for under the title *Acacia*, or *Geum*, or *Erythroxyton*, etc.

I, therefore, take the liberty again to call attention to the above-named principle, suggested by Link, and to speak in favor of using for a title, wherever possible, the official botanical name, in preference to the systematic one, where they differ from one another. For instance:

*Caryophyllata* in place of *Geum*.

*Coca* in place of *Erythroxyton*.

*Nux vomica* in place of *Strychnos*.

*Ratanhia* in place of *Krameria*.

*Pichurim* in place of *Nectandra*.

This would apply also to *Ammoniacum*, *Galbanum*, *Asafoetida*, *Myrrha*, etc.

Then would *Gummi Arabicum* again appear under its proper title and not under the title *Acacia*, for which, at the best, no future can be prophesied; to accord with this, *Tragacantha* should have been entered as *Astragalus*. My experience indicates that the hope to bring such new expressions as *Mucilago Acaciæ* into practical use is vain; for, although the young physicians trained in the universities have their attention directed to the new and legally introduced names, they speedily forget them in the intercourse with

their older colleagues, where they come in contact only with the older, fluent, and *appropriate* name.

As regards the groups *Aquæ*, *Liquores*, *Spiritus*, *Tincturæ*, all attempts to characterize them sharply and distinctly have been in vain.

If *aquæ* were to be defined as *indifferent waters*, then *aqua ammoniæ*, *calcis*, *chlori* would have to be excluded therefrom.

Should the term *liquores* be explained as *salt solutions*, then the gas solutions, *Liq. ammon. caust.* and *chlori* could not retain their places in this group; chlorine water and water of ammonia would then belong neither to *aquæ* nor to *liquores*.

The mineral waters would have to be designated as *liquores*, as the bitter waters, for instance, are salt solutions, and certainly not indifferent waters.

*Spiritus* would properly be designated by *alcoholic fluids* and *tincturæ* by *alcoholic plant extractions*; but how about *Tinctura iodi*? In short, it will easily be seen that in every such attempt a number of exceptions will at once present themselves.

For these reasons I would prefer strictly to follow the custom, which, in such cases as *Tinctura iodi*, seems almost peremptory. Of course, it is evident that this is no tincture from a pharmaceutical point of view, although it is a tincture according to the accepted meaning of the word, being a colored liquid. One way of expressing what is meant would be *Solutio iodi*; but then *Solutiones* would have to be introduced. It could, in preference, be called *Spiritus iodi*, in conformity with *Spiritus camphoræ*, which is also only a simple solution.

In want of a more acceptable characterization, therefore, it would, with these groups, be best to adhere to the time-honored, best known names.

*Philology.*—In looking over the report of the revision of the U. S. Pharmacopœia published in 1880, I noticed that in indicating the acid character of salts—for instance, *Sulfas*, *Phosphas*, *Nitras*, etc.—the *feminine* was used, and, although this was afterwards changed to the masculine in the U. S. Pharmacopœia, the Pharmacopœia Britannica has *retained* the feminine gender.

It might be well to call attention to the fact that in Latin the sub-

stantive endings *as*, *atis*, are used exclusively in the names of a few peoples and the inhabitants of cities, and that these are considered fundamentally masculine, although, of course, women as well as men were included. *Romani* meant both men and women.

There is, therefore, no good reason for departing from the custom in the masculine designation of salts, which was introduced by Berzelius, but to write exclusively *phosphas albus* and not *alba*, and the more so as the word *Sal* is used in the masculine as well as the neuter gender, but never in the feminine. In French, also, it is *le sulfate*.

The spelling of sulfur with an *f* instead of *ph* is justified by the fact that *ph* is of Grecian origin and was not adopted by the Romans, and, in fact, all modern languages of Roman origin have continued in this course, and always use *f* instead of *ph*, as *sulfate*, *sulfato*, etc. The etymology of *phosphorus* is uncertain; therefore, in that the *ph* may stand.

## GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

*Creosote pills*.—1.0 magnesia and 2.0 glycerin are triturated and 10.0 creosote gradually added; the following substances are then incorporated in the order named: 5.0 magnesia, 5.0 powdered licorice extract and q. s. (16.0–18.0) powdered licorice root; the mass is divided into 100 pills. The pills, when pressed on a piece of white paper, do not cause an oily stain; immersed in water they readily soften and disintegrate. *Tar pills*, which have recently been prescribed to some extent, can be made by the above formula, substituting 10.0 tar for the creosote.—E. Dieterich, *Pharm. Centralhalle*, 1893, 633.

*Thiosapol preparations* are soaps containing sulphur in chemical combination. *Thiosapol cocoa-nut oil soap* (containing about five per cent. sulphur) is made by heating 1 kg. linseed oil with 166 gm. sulphur to 120–160° C. until solution is effected and no separation of sulphur occurs on cooling; one kg. of this product is melted with one kg. cocoa-nut oil, and when cooled to 25° C., is incorporated with one kg. of solution of soda (35 per cent.) and allowed to stand until complete saponification takes place. *Thiosapol-sodium*, containing 10 per cent. sulphur, can be made by heating one kg. oleic acid and 120 gm. sulphur, the resulting product is

then thoroughly mixed with 600 gm. solution of soda (25 per cent.) and the excess of liquid later removed by expression; the sulphurated oleic acid may also be dissolved in two kg. 90 per cent. alcohol, saponified by the addition of 430 gm. solution of soda (35 per cent.) and the filtrate evaporated to dryness on a water-bath at 50° C.—*Pharm. Ztg.*, 1893, 663.

*Test for sesame oil.*—If five volumes of the oil be agitated with one volume of Bettendorf's reagent and heated in a water-bath for a few minutes a deep wine red color is imparted to the reagent. Olive oil containing a very small quantity of sesame oil will give rise to a red coloration; pure olive oil only causing an orange yellow coloration.—P. Soltsien, *Pharm. Ztg.*, 1893, 654.

*The extraction of volatile oils from flowers* is effected by G. Morpurgo, by arranging a series of boxes containing the odorous material which are alternately connected with Woulff's bottles partly filled with a purified vaseline oil. By means of an air pump air is first purified, by passing it through an alkaline solution of pyrogallol (this solution absorbs part of the atmospheric oxygen and the resulting mixture of nitrogen and oxygen has been found to exert very little effect in altering the oils, thus it was possible by this method to extract the oils from violets which could not be done by simply using air), and then it enters the bottom of the box filled with the material and, becoming charged with the vapor of the essential oil, escapes above, and passes into the Woulff's bottle giving up the essential oil vapor to the mineral oil; the air then enters a second box, etc. The material after wilting is removed and replaced by fresh; the mineral oil afterwards is made to give up the essential oil to deodorized alcohol. By spraying some of the flowers with alcohol the extraction was greatly facilitated, in some cases as in tuberoses, heliotrope, etc., this procedure on the contrary is detrimental.—*Pharm. Post*, 1893, 405.

*Iridin*, a glucoside existing in the root of *Iris Florentina*, was prepared by mixing the alcoholic extract with warm water, and adding a mixture of acetone and chloroform, having a specific gravity of 0.950; upon standing the mixture separates into two layers, in the heavier of which the glucoside is suspended as amorphous, white floccules which can be crystallized from boiling diluted alcohol, in white needles, becoming yellow in moist air, and melting at 208°; hot

alcohol, acetone and water will dissolve it, especially the first two ; the acetone solution is precipitated by chloroform. Cold, dilute acids do not decompose it, but the alkalis produce deep yellow solutions containing alteration products ; hot diluted acids in the presence of alcohol decompose it according to the reactions  $C_{24}H_{26}O_{13} + H_2O = C_6H_{12}O_6 + C_{18}H_{16}O_8$ , the last formula represents *irigenin* which is well crystallizable, melts at  $186^\circ$ , has the properties of a phenol and gives with ferric chloride an intense violet color. Irigenin, with strong alkalis, yields formic acid, *iridic acid*  $C_{10}H_{12}O_5$ , and a phenol  $C_7H_8O_4$  called *iretol* ; iridic acid above its melting point,  $180^\circ$  C., yields carbon dioxide, and the phenol *iridol*  $C_7H_5(OCH_3)_2OH$  which melts at  $57^\circ$  C.—(*Berichte*) *Apotheker Ztg.*, 1893, 523.

*Glucosides of alcohols.*—If gaseous hydrochloric acid be passed into a methyl alcohol solution of glucose, which is kept cold by refrigeration, the mixture after a short time loses the power of reducing Fehling's solution and will yield a well crystallizable product having the formula  $C_6H_{11}O_6 \cdot CH_3$ . This reaction is characteristic for all alcohols which dissolve glucose ; alcohols which do not dissolve glucose will still give the reaction if the glucose be replaced by acetic chlorhydrate, which is easily soluble in ether, chloroform and benzole and by the gaseous hydrochloric acid decomposes, yielding glucose as one product, which then unites with the alcohol as above. The derivatives of ethyl and methyl alcohol with mannose, galactose, glucoheptose, arabinose, xylose, rhamnose and fructose were obtained ; sugar of milk (lactose) and maltose do not follow the rule because of their aldehydic character. This class of compounds react very much like the natural glucosides ; while boiling alkalis, phenylhydrazine and Fehling's solution produce no change ; boiling with dilute acids decomposes them into the components. Interesting is the fact that some of these compounds have a sweet others a bitter taste, and hence the possibility that the so-called vegetable bitter principles may belong to this class. The name proposed for the class is simply to change the *ose* of the sugar into *osid* and precede this term by the name of the alcohol radical as methyl glucosid, ethyl arabinosid, etc.—Emil Fischer (*Berlin. Akad. d. Wissensch.*) *Chem. Repert.*, 1893, 234.

*Chionanthin*, a glucoside from *chionanthus virginica*, was isolated by extracting the root with hot petroleum ether ; after distilling off

the solvent the residue separated white, partly crystalline, partly amorphous crusts, which, after washing with cold alcohol were dissolved in boiling alcohol, when upon the cooling of the solution the glucoside separated. It is only slightly soluble in cold water and alcohol, but is soluble in hot water and hot alcohol; it has the formula  $C_{22}H_{28}O_{10} + 2H_2O$  becomes anhydrous at  $110^{\circ}C.$  and at higher temperature is colored red-violet, and melts, forming a transparent, glassy mass; dilute acids yield dextrose, and a red-brown resinous substance, soluble in ether and alcohol, this decomposition is attended by a strong odor, recalling balsam of Peru. A preliminary examination of the bark gave indications of alkaloids with Mayer's reagent and potassium tri-iodide; the aqueous decoction with lead subacetate gave a copious precipitate which after washing with water and alcohol was decomposed by hydrogen sulphide; after filtering and evaporating a yellowish powder was obtained, soluble in hot water, but precipitating again upon cooling, this aqueous solution gave the alkaloidal indications; it is soluble in alkalies and alkaline carbonates. Saponin was tested for, but without confirmatory results.—W. von Schulz, *Pharm. Ztsch. f. Russl.*, 1893, 579 and 593.

*Resorbin*, a new ointment base, is an emulsion of sweet almond oil, containing a small quantity of wax, with a dilute aqueous solution of gelatin or soap.—*Pharm. Centralhalle*, 1893, 688.

*Sanguinal*, a blood-forming medicament, contains 10 per cent. of pure oxyhæmoglobin, 46 per cent. of the salts existing in the blood, and 44 per cent. of freshly-peptonized muscular albuminoids.—*Pharm. Centralhalle*, 1893, 687.

*Phosphorus* is prepared by a process patented by Rossell, of Bern, by which glacial phosphoric acid or alkaline metaphosphates are heated with metallic zinc or aluminum, the metals dissolve in fused acid or its salts, and phosphorus distils over; this reaction takes place at a low red heat, whereas in the older process of reducing the metaphosphate with carbon a very intense heat was necessary.—*Südd. Apotheker Ztg.*, 1893, 538.

*Somatose* is a meat preparation containing large quantities of albumoses with very little peptone; it is claimed to be more easily assimilated, and more agreeable, than the usual meat preparations containing considerable peptones.—Dr. F. Goldmann, *Südd. Apotheker Ztg.*, 1893, 529.



*Quercitrin and similar principles* have been investigated by U. Rudolph, with a view of establishing their identity or points of difference. The yellow coloring principles of the following plants were made according to the directions of the discoverers: (1) Quercitrin bark (quercitrin). (2) *Sophora japonica* (sophorin). (3) *Viola tricolor* var. *vulgare* (viola-quercitrin). (4) *Æsculus hippocastanum* (æsculus-quercitrin). (5) *Capparis spinosa* (capparis-quercitrin). (6) *Thuja occidentalis* (thujin). The composition of these principles is expressed by the following formula, showing that a close relationship exists between some of them: (1)  $C_{21}H_{20}O_{11}$ ; (4)  $C_{21}H_{22}O_{12}$  or 1, with one molecule  $H_2O$ ; (2), (3) and (5) have the formula  $C_{27}H_{30}O_{16}$ ; (6) has an intermediate formula and differs also in that the decomposition product *thujetin* yields reactions differing from those obtainable with the decomposition products of the other five principles. (1-5) inclusive, by hydrolysis, give isomeric products having the formula  $C_{15}H_{10}O_7$ , but which are not considered identical because of differences in melting points and solubilities. The hydrolyses are indicated by the two following reactions:  $C_{21}H_{20}O_{11} + 2H_2O = C_6H_{14}O_6 + C_{15}H_{10}O_7$ ;  $C_{27}H_{30}O_{16} + 3H_2O = C_6H_{14}O_6 + C_6H_{12}O_6 + C_{15}H_{10}O_7$ . The isodulcite ( $C_6H_{14}O_6$ ) showed some differences in crystalline form; in (2), (3), (5) and (6) the isodulcite is accompanied by a fermentable sugar. Notable differences are apparent when the amounts of sugar and isodulcite (expressed as isodulcite) and the quercetin-like bodies (quercetin, sophoretin and thujetin) obtained by hydrolysis are compared.

	1.	2.	3.	4.	5.	6.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Isodulcite, . . .	38'99	57'16	55'78	36'83	56'73	38'16
Quercetin, etc., .	68'68	49'54	51'86	65'65	49'61	62'25

—(Jurjew-Dissertation), *Pharm. Post*, 1893, 529.

*Birch-* and *Fir tar* show the following properties according to an examination by E. Hirschsohn: *Birch tar* at 20° C. has a specific gravity of 0.926-0.945 for the better grades and 0.953-0.987 for inferior grades. The aqueous solution, obtained by agitating one part tar with ten parts water, is almost colorless, has an acid reaction, and is colored green with ferric chloride (1 : 1,000); 5 cc. of the aqueous solution with 2-3 drops aniline and 4-6 drops hydrochloric acid gives a yellow mixture; if the birch tar be adulterated with fir tar or other kinds of tar a red mixture results. Birch tar

with twenty volumes of benzin imparts to the latter only a pale-yellow color; the benzin solution agitated with an aqueous copper acetate solution (1 : 1,000) should not take a greenish color. *Fir tar* has a specific gravity at 20° C. of 1.02–1.15; the aqueous solution (1 : 10) has a yellowish color, an acid reaction, and with ferric chloride gives a red coloration; 5 cc. of the aqueous solution with aniline and hydrochloric acid gives a red mixture which when agitated with chloroform imparts to the latter an intense red color. The benzin solution agitated with aqueous copper acetate causes a green coloration. *Fir tar* is perfectly soluble in nine volumes of 90 per cent. alcohol; a turbid mixture indicates admixtures with birch tar, kerosene.—*Pharm. Ztschr. f. Russl.*, 1893, No. 42.

*Test for glucose*.—3–4 cc. of a sugar solution boiled for one minute with 0.12 iodic acid and 0.2–0.4 sodium hydrate, allowed to cool, acidified with dilute hydrochloric acid and ammonium hydrate added so as to form a layer will cause a dark precipitate, a combination of nitrogen and iodine. This test is characteristic for glucose and is not given by ketones and aldehydes in general; the test may be useful in the examination of urine for sugar, as normal urine does not give the reaction.—A. Jaworowsky (*Wiadomoszy Farmaceut.*), *Pharm. Post*, 1893, 549.

*Gurjun balsam in copaiba balsam* may be detected by two methods proposed by E. Hirschsohn, in *Pharm. Ztschr. f. Russland*, 1893, No. 43.

If 2–4 drops of the suspected balsam be added to 1–2 cc. of a solution of 1.0 pure concentrated sulphuric acid in 25.0 pure acetic ether no red or violet coloration should be produced. The different varieties of copaiba with this test give only a yellow or pale brownish-yellow color, but the addition of 10 per cent. Gurjun Balsam to copaiba causes a red coloration gradually changing to a reddish violet. A second method of applying the test was devised after ascertaining that the substance causing the red color is at least partly soluble in water. One volume of the balsam is agitated several times at the ordinary temperature with 3–4 volumes of water, filtered through a wetted filter and the filtrate mixed with an equal volume of hydrochloric acid of specific gravity 1.12; no red coloration should develop in the course of fifteen minutes. Pure copaiba by this modification fails to give any color, but if containing 10 per

cent. gurjun balsam the red color develops in a few minutes; if containing 20 per cent. gurjun balsam the color is more intense and is more quickly developed.—*Apotheker Ztg.*, 1893, 565.

*Scoparin*, isolated from the aqueous extract of *Spartium Scoparium*, by Stenhouse, has the formula  $C_{19}H_{16}O_8(OH)(OCH_3)$  (and not  $C_{21}H_{22}O_{10}$ ); it melts at  $202^\circ$  if heated slowly, at  $219^\circ$  if heated rapidly. It crystallizes from 70 per cent. alcohol in yellow needles containing  $5H_2O$  and becomes anhydrous at  $105^\circ C.$ ; it is soluble in hot water, the solution reducing alkaline copper and silver solutions. Scoparin is not a glucoside as by hydrolysis it yields no sugar, but a brownish yellow substance melting with decomposition at  $260-270^\circ$ , having the formula  $C_{20}H_{16}O_8 + 2\frac{1}{2}H_2O$ . The difficultly soluble modification of scoparin, which is obtainable by boiling the above described substance with alcohol, forms a yellow powder melting at  $234-235^\circ C.$ , and can be changed into the first form by dissolving in alkali and supersaturating with acid.—Goldschmidt and v. Himmelmayr (*Monatsh. f. Chem.*) *Apotheker Ztg.*, 1893, 566.

*Extract of male-fern* prepared without the use of copper utensils has a yellowish-green color; if prepared in a copper vessel this normal color is changed to a pure green, and, hence, Peters recommends the examination for copper in all pure green colored extracts.—*Apotheker Ztg.*, 1893, 594.

*Irone*, an odorless principle, has been isolated by Tiemann and Krüger from orris root which is known to possess the aroma of violets, it is a methylketone, having the formula  $C_{13}H_{20}O$ . An isomeric ketone was prepared synthetically from citral, the odorous principle of lemon oil and which is also present in other oils. This ketone is called *ionone*, it has an odor very much like that of irone, but is a little milder and recalls the odor of flowering violets; it is believed that one of these substances is present in violets, but the quantity is so exceedingly small that this proportion is only possible on a large manufacturing scale.—(*Berliner Akad.*) *Pharm. Ztg.*, 1893, 699.

*Caffein-sulphonates* have recently been recommended by Heinz and Liebrecht as an unobjectionable, safe diuretic, especially in the treatment of dropsy. The sodium salt has been called by the name *nasrol*; recently the manufacturing firm having placed upon the

market the sodium salt under the name of Symphorol N; the lithium salt is called Symphorol L, the strontium salt Symphorol S.—*Pharm. Ztg.*, 1893, 704.

*Loretin* or m-Jodo-o-oxychinoline-ana-sulphonic acid a substitute for iodoform and carbolic acid, forms a yellow crystalline powder which is difficultly soluble in water and alcohol and insoluble in ether oils; suspended in collodion and oils it is useful for certain purposes; mixed with a few per cent. of magnesia it can be used as a dusting powder. With the alkalies it forms orange red salts soluble in water, a 2-5 per cent. solution of the sodium salt can replace carbolic acid water as a wash. The calcium salt is insoluble and can be precipitated upon gauze by first impregnating the gauze with the sodium salt and then immersing in solution of calcium chloride.—*Pharm. Ztg.*, 1893, 746.

*Gymnemic acid* is recommended by Dr. V. Oefele as a means of counteracting the disagreeable sweet or bitter taste so noticeable in cases of diabetes. As a convenient mode of administering the acid 0.1 gm. is dissolved in sufficient alcohol so as to impregnate 4 gms. Pekoe tea leaves; one or two leaves are placed in the mouth several times a day, as necessary.—*Rundschau*, 1893, 996.

## ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

*Benzoylcinchonine* is prepared by E. Leger by the following process which is a modification of Schützenberger's process, published in 1858: 50 gm. of precipitated and dried cinchonine are introduced into a vial with 30 gm. benzoyl chloride; close the vial and heat on a water-bath for an hour, when the reaction is finished, take up the viscous product with water; add to this solution an excess of  $NH_3$  and agitate with ether. The ethereal solution is washed with water, concentrated by distillation, and allowed to rest for a day. Now decant the ethereal solution of benzoylcinchonine, evaporate, and place the viscous product under a bell-glass over sulphuric acid. When it has completely solidified, pulverize it, redissolve in ether, filter and concentrate the solution when, after twenty-four hours, the benzoylcinchonine will crystallize out. It is insoluble in water, but forms syrupy solutions with alcohol and ether, from which it does not again crystallize; it is much less soluble in absolute ether. It

combines with acids to form basic and neutral salts. Benzoylcinchonine is feebly lœvogyre and the rotary power of its acid solutions is inferior to that possessed by the alcoholic solutions, and diminishes as the quantity of acid is increased.

The author has likewise prepared and studied a number of salts of this base.—*Jour. de Pharm. et de Chim.*, November, 1893, p. 405.

*Guaiacol*, used as a protective, has been studied in its effects by L. Guinard, who concludes that the lowering of the temperature which has been noticed upon using guaiacol for this purpose is not due to the absorption of the medicament by the skin; the rapidity of the action being sufficient proof, although it is possible after a time through its local action upon the epidermis. The presence of guaiacol in the urine of patients, upon whom it has been used as a protective is due to its vapors penetrating the respiratory passages, although this quantity is not sufficient for producing the lowering of temperature. In noting the local and general effects of guaiacol it is necessary to take into consideration: (1) The quality of the product; (2) the susceptibility of the individual, and (3), his state of health; there is little effect upon the temperature of apyretic subjects. The local effect of guaiacol is more pronounced if the part protected is excluded from the air by an impermeable covering.—*Bull. Gén. de Therap.*, October, 1893, p. 339.

*Sulphur ointment*, associated with oil of cade and green soap, is used by Hébra, in the treatment of prurigo, and the following has been formulated by him: sulphur, 15 gm.; oil of cade, 15 gm.; green soap, 30 gm.; lard, 30 gm., and prepared chalk, 10 gm.—*Rev. de Thér. Med.-Chirurg.*, November, 1893, p. 581.

*Reagent for detecting albumin in urine.*—The reagent (Spiegler's) consists of the following: Bichloride of mercury, 2 p.; tartaric acid, 1 p.; distilled water, 50 p.; glycerin, 5 p. The urine is strongly acidulated with acetic acid, filtered, and by means of a pipette the filtered liquid is introduced into a test-tube containing 2 cc. of the reagent. If albumin is present a white ring will appear at the point of contact. The reagent will detect 1 : 350,000.—*Boll. Chim. Farm.; L'Union Pharm.*, November, 1893, p. 495.

*Volumetric estimation of calcium, strontium and barium.*—The following process, based upon the property possessed by alkaline carbonates, of precipitating the oxides of the fourth group, occupies

but a few minutes and is, according to the author, M. Vizern, absolutely exact. The perfectly neutral solution of the salt to be estimated, to which a few drops of an alcoholic solution of phenolphthaleine are added, is heated to near the boiling point and then an alkaline carbonate solution (53 gm. sodium carbonate per liter) is added drop by drop, from a graduated burette, until a permanent rose-red tint is produced. Note the quantity used and calculate.

1 cc. normal alkaline solution	= 0.02	gm. calcium.
1 cc. " "	= 0.04375	gm. strontium.
1 cc. " "	= 0.0683	gm. barium.

The process, however, cannot be applied if the liquid contains any other substance precipitable by the alkaline carbonate. Following are some of the results obtained by the author:

	Estimation by Weight.	Volumetric Estimation.
Barium, . . . . .	1.244 gm.	1.253 gm.
Strontium, . . . . .	0.697 gm.	0.7087 gm.
Calcium, . . . . .	0.638 gm.	0.642 gm.

—*Four. de Pharm. et de Chim.*, November, 1893, p. 442.

*Creosotal* is the carbonate of creosote, containing 90 per cent. of pure creosote, rich in guaiacol; it is a thick liquid and has a neutral reaction; is insoluble in water, but soluble in four or five parts of cod-liver oil or olive oil. The daily dose for a child is 1–6 gm., and 4–15 gm. for an adult. It can be made into an emulsion by beating  $\frac{1}{2}$ –2 teaspoonfuls with the yolk of an egg and diluting with sweetened and aromatized water.—*Four. de Pharm. d'Anvers.*, November, 1893, p. 415.

*Vasogen* or oxygenated vaseline, which is a mineral oil treated with an excess of hydrogen dioxide, forms an emulsion with water upon treatment with alkalis. It is a good excipient for iodoform, creosote, ichthyol, menthol, pyrogallol, chrysarobin, etc., but as it loses the property of forming an emulsion by the action of heat, these must be incorporated during the process of preparation.—*Ibid.*, p. 416.

*Nasrol*, the sulphocaffeinate of sodium is recommended as an energetic diuretic; it has a bitter taste, is very soluble in boiling water, but only slightly soluble in cold water.—*Ibid.*, p. 416.

*Lanaine*, which is extracted from wool, is a clear, yellow heterogeneous fat, fusible near 36° C., neutral and permanent in air; it is easily soluble in ether, benzene, chloroform and acetone; but

difficultly soluble in cold alcohol; it is composed principally of fatty acids, cholesterin and ischolesterin, which are saponified with potassium and sodium in alcoholic solution, but not in aqueous solution.—*Ibid.*, p. 417, from *Rép. de Pharm.*

*Cristalline* is a kind of collodion, in which the ether and alcohol, employed as solvents for pyroxylin, are replaced by methyl alcohol. It differs from collodion, in that the solvent evaporates more slowly, and in forming a transparent film, which allows the part it protects to be seen and the progress of the treatment followed. An elastic cristalline can be obtained by adding 20 gm. cristalline to 5 gm. castor oil and 10 gm. Canada turpentine. Cristalline dissolves pyrogalllic and salicylic acids, chrysarobin and many other medicaments. The only disadvantage of its use is its odor.—*Semaine médicale*, October 18, 1893.

*Copaiba* has been found to act as a powerful diuretic, especially in cirrhosis of the liver, by Dr. Bronowsky, who administered in twenty-four hours, 6 gm. in emulsion with extract of peppermint. Copaibic acid was passed in the urine after the first day of the treatment, while the maximum diuretic action was reached on the third or fourth day.—*Gaz. lek.*; through *Nouv. Remèdes*, November, 1893, p. 504.

*That quinine salts are incompatible with asaprol* has been shown by Edhem Ismail, who says (*Rép. de Pharm.*, November, 1893, p. 487) that when a solution of a basic or neutral quinine salt (the sulphate or the hydrochlorate) is poured at once into a solution of asaprol, a resinous body appears on the surface of the liquid, which is insoluble in water and soluble in 90 per cent. alcohol. If an asaprol solution is gradually added to a solution of a quinine salt, a white precipitate is deposited in the bottom of the tube, and becomes soft and grayish.

*Iodocaffeine* is obtained by dissolving in the cold a mixture of 35 parts of sodium iodide and 65 parts of caffeine iodide, in sufficient water, treating this solution with hydrogen sulphide and evaporating to dryness.

*Iodotheine* is obtained by a similar process, while the preparation of *iodotheobromine* is more difficult, on account of the insolubility in water of theobromine; to obtain this compound a concentrated solution of salicylic acid is added to the mixture of sodium iodide

and theobromine. The author, M. Rummo, has also studied the physiological action of these three compounds and finds that they each exercise a special action on the heart.—*Sem. méd.; Rép. de Pharm.*, November, 1893, p. 495.

*A ferment present in fungi.*—Em. Bourquelot examined a large number of species of fungus, which he enumerates, for the purpose of solving the question as to how these growths, especially such as are parasites or saprophytes, assimilate and utilize the substances which enter into the composition of the organism upon which they exist. The author found a ferment, analogous to emulsin, present almost exclusively in such fungi as are parasite upon trees or grow upon old wood.—*Jour. de Pharm. et de Chim.*, November, 1893, p. 385.

*Test for sesame oil in butter.*—A. Jorissen calls attention to the fact that butter which is colored with curcumin, but contains no foreign fats, also responds to Baudoin's test, which has been applied for the detection of sesame oil, that is a violet coloration with hydrochloric acid in presence of sugar; but as it also shows this coloration with hydrochloric acid alone, the filtered fatty body should first be subjected to this test, before applying Baudoin's test.—*Jour. de Pharm. d'Anvers*, September, 1893, p. 321.

## ASSAY OF ALKALOIDAL DRUGS.<sup>1</sup>

BY C. C. KELLER.

Alkaloidal assaying has received a valuable contribution in the work of C. C. Keller, which appeared in a publication commemorating the fiftieth anniversary of the organization of the Swiss Apothecaries Association. *Nux Vomica.*—15 gm. of the dried and finely powdered seeds are placed in a small extraction tube (12 cm. long, 25 mm. wide, terminating in a delivery tube 7 mm. wide and 5–6 cm. long, the end of which is ground obliquely; the upper end of the extraction tube is ground so that it can be covered with a small glass plate), uniformly packed and percolated with ether (this is facilitated by connecting the apparatus with an air-pump until the ether reaches the small plug of cotton) allowing the percolate to drop into a vial

<sup>1</sup> Translated and abstracted for the American Journal of Pharmacy, by F. X. Moerck, Ph.G.



of 150 gm. capacity until 10 drops of the percolate leave no residue upon evaporation, which requires about 100 cc. ether and from 30 to 90 minutes according to the fineness of the powder. (To determine the amount of alkaloid extracted in this treatment by the solubility of the alkaloidal salt in the fixed oil solution, the ethereal solution was agitated with an excess of  $\frac{n}{10}$  hydrochloric acid, the greater part of the ether decanted and the residual liquid titrated with  $\frac{n}{10}$  ammonia using iodoeosin as indicator (*Am. Journ. Pharm.*, 1892, 521). The rather remarkable observation was made in this connection that using the unpeeled nux vomica about 24 per cent. of the total alkaloid was found in the yellow ethereal solution against only 7 per cent. in the case of peeled nux vomica yielding a colorless filtrate; the fat averaging 3.15 per cent. The extraction tube is next placed on a dry, tared vial of 250 gm. capacity, the cotton plug pushed into the vial and the drug washed in with ether adding of the latter to make up to 100 gm.; after adding 50 gm. chloroform and thoroughly agitating 10 cc. ammonia water (10 per cent.) are added and the mixture shaken repeatedly during half an hour. In the meantime the ethereal fat solution is agitated with 5 cc.  $\frac{n}{10}$  hydrochloric acid and 10 cc. water, pouring off the ether as far as practicable and securing a complete separation by the use of a separating funnel which is then washed with several portions of water so that the acid solution and washings measure 25 cc. This acid liquid is added to the mixture in the vial, shaking for several minutes, and after the separation into two layers 100 gm. of the ether-chloroform solution are poured (if necessary through a small filter moistened with the solvent) into a tared Erlenmeyer flask and the solvent distilled off. The alkaloids remain as a colorless varnish which is freed with difficulty from the chloroform by heat, but which can be easily effected by covering the alkaloids several times with small quantities of alcohol which is then boiled away in a water-bath; the alkaloids during these operations become crystalline and can be dried to constant weight at a temperature *not exceeding* 95–100° C. The alkaloids can then be titrated by dissolving in 5 cc. chloroform with the aid of a little heat, adding 40 cc. ether, 10 cc. water, one drop of an alcoholic iodoeosin solution (one per cent.) and 10 cc.  $\frac{n}{10}$  hydrochloric acid; after agitation the excess of acid is titrated with  $\frac{n}{10}$  ammonia until a permanent red color appears in the aqueous solution; after each addition of ammonia the flask must be corked

and agitated; 1 cc.  $\frac{n}{10}$  acid is taken as the equivalent of 0.0364 gm. alkaloid. The following table exhibits the results:

ALKALOIDS.			
	By Weighing.	By Titrating.	Difference.
	Per Cent.	Per Cent.	Per Cent.
(1) Unpeeled, . . . . .	2.640	2.548	0.092 = 3.50
(2) Unpeeled, . . . . .	2.685	2.611	0.074 = 2.01
(3) Peeled, . . . . .	2.855	2.795	0.060 = 2.10
(4) Peeled, . . . . .	2.780	2.725	0.055 = 2.18

The difference between weighing and titrating is so slight that the former suffices for practical pharmaceutical purposes and enables the assay to be completed in less than three hours. It is important to adhere to the use of two parts ether and one part chloroform in the extraction, since a larger proportion of chloroform increases the yield of crude alkaloids (probably caused by solution of the glucoside loganin; the red color obtained by warming the crude alkaloid with dilute sulphuric acid indicates this), and hence, a greater difference is shown between the weighed and titrated alkaloids. The use of a greater proportion of ether risks loss of alkaloids by crystallization since the alkaloids are almost insoluble in pure ether. The fear that the peeled *nux vomica* contains a considerably higher percentage of alkaloids than the unpeeled appears groundless from the results of the analyses quoted; for pharmaceutical purposes the peeled *nux vomica* is preferable because of its advantages in making tincture and extract.

*Strychnos bark* is assayed as the seeds with the difference that the bark is first percolated with a mixture of ether and chloroform; these solvents extract only traces of alkaloid, but leave a dark greenish brown residue of chlorophyll, fat, wax, etc., amounting to 0.93 per cent. of the bark. The yield of alkaloids is higher than in the seeds, three determinations giving 4.55–4.56 per cent.; the alkaloids were obtained as a yellowish varnish which required treatment with four portions of alcohol before a crystalline appearance was noted; the residue was obtained of constant weight after considerable difficulty due to the preponderance of brucine; by a method to be described there was found in the alkaloidal residue, strychnine 33.6 per cent., brucine 66.4 per cent.

The dry alcoholic extract of *nux vomica* was assayed by placing 1.5 gm. of the dry, finely powdered extract in a vial of 150 gm. capacity containing 10 gm water, agitating until a uniform mixture

is obtained, adding 30 gm. chloroform and 60 gm. ether, and, after agitating, 5 cc. ammonia water (10 per cent.) The mixture is agitated for several minutes, and the vial set aside; after 15–30 minutes the mixture will separate so that 60 gm. of the chloroform-ether solution can be transferred to an Erlenmeyer flask, filtering if necessary, and the assay finished as already described. An extract made by himself from the unpeeled seeds (which had previously been extracted with ether), and 70 per cent. alcohol yielded 12 per cent. extract containing 21.2 per cent. alkaloids; two commercial extracts yielded 14.3 and 16.2 per cent. alkaloids.

*The quantitative separation of strychnine and brucine* is effected by a modification of Gerock's method, and is dependent upon the alteration of brucine sulphate by dilute nitric acid into compounds having no basic character, while strychnine sulphate suffers very little or no decomposition under the same circumstances. 0.2–0.4 gm. of the purified alkaloids (the crude alkaloids are dissolved in dilute sulphuric or hydrochloric acid with the aid of heat, the solution filtered and extracted with a mixture of 3 parts chloroform and 2 parts ether after adding ammonia in excess: the chloroform-ether solution leaves the alkaloids colorless and perfectly soluble in dilute acids; any loss occasioned in the purification is of no moment, since it is desired to establish only the relative quantity of the two alkaloids) are dissolved in an Erlenmeyer flask in 10 cc. dilute sulphuric acid (10 per cent.), applying heat cautiously so that as little evaporation as possible takes place; after cooling one cc. concentrated nitric acid sp. gr. 1.41–1.42 is mixed with the solution (very frequently the sulphuric acid solution upon cooling deposits crystals of strychnine sulphate which dissolve again on the addition of the nitric acid), producing the well-known red coloration of brucine with nitric acid; the flask is set aside for one or one and a half hours at the ordinary temperature, adding at the expiration of the time 40 gm. chloroform and 40 gm. ether and, after agitation, 10 cc. ammonia water (10 per cent.); the mixture is shaken for several minutes and 40 gm. of the chloroform-ether solution filtered into a tared flask, the solvent distilled off and the residue (strychnine) dried at 95–100° C. and weighed. The crystallization of the strychnine is so sudden that the crystals are thrown around in the flask with considerable violence; to obviate this the distillation should be discontinued as soon as crystallization commences and the remainder of the solvent gotten

rid of by an air-current which also facilitates the final drying. The strychnine is generally of a yellowish color due to traces of adhering coloring matter; it must always be tested for brucine by solution in concentrated sulphuric acid and addition of a small crystal of potassium nitrate, only a pale yellow color being allowable. This method is also satisfactory in testing commercial brucine for strychnine. Six determinations of the strychnine in the alkaloids from nuxvomica gave results varying from 45.1–50.6 per cent., and averaging 47.16 per cent., confirming the statement of Beckurts that the two alkaloids are present in about equal parts.

*Cinchona bark assays* are made by a very much simplified Haubensack-Kuersteiner method (*Am. Journ. Pharm.*, 1891, 347; 1893, 71). 12 gm. of the dried and finely powdered bark are placed in a vial of 250 gm. capacity, 120 gm. ether and after agitation 10 cc. ammonia (10 per cent.) added and the mixture repeatedly shaken during half an hour; if the bark to be assayed is succirubra 10 cc., if calisaya, 15 cc. water are added and the mixture agitated for one minute; 100 gm. of the ethereal solution (which from succirubra is perfectly clear, from calisaya, however, is somewhat turbid) briskly agitated in a flask with 3 cc. dilute sulphuric acid and 37 cc. water and allowed to stand for about ten minutes when a perfect separation will allow of the decanting of the greater portion of the ethereal layer, the remainder is transferred along with the acid solution to a small separator and the acid solution allowed to run off into a beaker and the flask and separator rinsed with 10 cc. water; the acid solution is freed from ether by warming and replaced in the cleansed separator, where it is agitated with a mixture of 30 gm. chloroform and 10 gm. ether along with 5 cc. ammonia water. The chloroform-ether solution is run into a flask and the agitation repeated with 15 gm. chloroform and 5 gm. ether; the united alkaloidal solutions are filtered through a small chloroform-wetted filter into a tared flask and the solvents distilled off. The alkaloids from calisaya are generally crystalline, from succirubra amorphous and retaining chloroform; by the addition of 3 to 5 cc. absolute alcohol and boiling this away in a water-bath the alkaloids are obtained crystalline and capable of being easily dried at 100° C.; a higher temperature is to be avoided. The weighed alkaloids may be titrated by dissolving in 10 to 15 gm. alcohol, adding water until precipitation commences, and titrating with  $\frac{n}{10}$  hydrochloric acid

using hæmatoxylin as indicator (1 gm. hæmatoxylin dissolved 100 gm. diluted alcohol with 2 to 3 drops of ammonia). From the results of a large number of assays 1 cc.  $\frac{n}{10}$  hydrochloric acid is the equivalent of 0.0315 gm. calisaya alkaloids and of 0.0304 gm. succirubra alkaloids.

*Fluid extract of cinchona* is assayed by diluting 6 gm. fluid extract with 15 gm. water, adding 90 gm. ether and 5 gm. ammonia water and agitating repeatedly during one-half hour; from 75 gm. of the clear ethereal solution, representing 5 gm. of the fluid extract, the ether is distilled off and the alkaloids weighed at 95 to 100° C. The alkaloids must be titrated by dissolving in 10 gm. alcohol, adding 40 gm. water, two drops hæmatoxylin solution and sufficient  $\frac{n}{10}$  hydrochloric acid to produce a permanent yellow coloration.

In assaying *extract of cinchona* 1.5 gm. are triturated with 15 gm. water, transferred to a vial of 150 cc. capacity, 90 gm. ether and 5 cc. ammonia water added, thoroughly agitated during one-half hour and 60 gm. of the clear ethereal solution representing one gram extract proceeded with as above.

The thalleioquin test can be made with these several titrated solutions by diluting 1 cc. with 9 cc. water, adding 2 to 3 drops bromine water and, lastly, 1 cc. ammonia water.—*Oesterr. Ztschr. f. Pharm.*, 1893, 563 and 586.

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## THE ACTION OF ZINC AND MAGNESIUM UPON METALLIC SOLUTIONS, AND THE DETERMINATION OF POTASSA.

BY A. VILLIERS AND F. BORG.

The electrolytic methods which enable us to determine, and often, indeed, to separate, metals are becoming more and more utilized in analytical chemistry. It seems, however, at first sight that we might in a great number of cases substitute for them a more rapid method, which consists in displacing metals by another metal, such as zinc or magnesium.

In reality, this latter procedure is applicable only in a very limited number of cases (copper, gold, platinum). The metals are not, in general, precipitated in a state of purity, but as alloys containing larger or smaller quantities of magnesium or zinc.

The proportion of these latter varies with the acidity of the

liquids and with the weight of the metal employed. Another cause has also a remarkable influence upon this proportion—the degree of purity of the metal. It is thus that the weights of platinum displaced by equal weights of different specimens of zinc in equal volumes of one and the same solution of platinum chloride, have been 100.92, 100.39, 119.12 per cent.; that is to say, the platinum has been precipitated with excesses of 0.92, 10.39 and 19.12 per cent. The first specimen of zinc had been obtained by the electrolysis of an ammoniacal solution of pure zinc sulphate; the second was a distilled zinc, containing no impurities except traces of sulphur not determinable by the balance; the third was commercial zinc, containing 1.1 per cent. of impurities, of which 0.44 was fixed matter.

These results show that zinc cannot be used for the determination of platinum even after a correction for the impurities. When the zinc is impure, the presence of the impurities, even in an infinitely slight quantity, occasions the fixation of a very notable quantity of this metal upon the platinum. Electrolytic zinc gives results which are merely approximate.

Magnesium, as it is found in commerce in the form of ribbons, is, on the contrary, quite suitable for the determination of copper, gold and platinum; and, consequently of potassium, after a precipitation as double platinum-potassium chloride.

*Determination of Copper.*—When copper is accompanied by no other metals except the alkaline and earthy metals, it may be determined very quickly and easily in the metallic state by treating its solutions with magnesium. The copper is thus liberated, in a slightly acid liquid, in the form of a granular precipitate very easy to wash. The washing is finished with alcohol; the metal is dried at 100° and weighed.

We may make use of a weighed filter, or more simply deposit the reduced copper in a small weighed capsule.

The process is not applicable in presence of metals like zinc easily acted on by hydrochloric acid; there are produced alloys even if the liquids are very acid.

*Determination of Potassium.*—If we determine potassium in the double platinum chloride, the precipitate is collected, after desiccation, on a weighed filter. Or we incinerate the filter, ignite the precipitate in hydrogen, and determine the platinum in the residue,

after having removed the potassium chloride with water. The former method presents the causes of error inherent in the use of weighed filters. The latter method is tedious, and involves the successive incineration of two filters.

The following method is very rapid and very accurate. The double chloride, obtained in the ordinary manner, is washed with a mixture of equal volumes of alcohol and anhydrous ether, in the capsule in which it has been produced, until the filtrate runs through absolutely colorless—a result obtained with a small volume of the mixture. The residual salt is dissolved in boiling water, collecting the solution in a conical vessel. We add to it a little pure hydrochloric acid, and introduce gradually fragments of magnesium until the liquor is completely decolorized and the magnesium dissolves without its surface becoming tarnished.

The platinum thus deposited is very easy to wash, and does not adhere to the sides of the capsule. It is brought upon a filter without folds; the filter, after desiccation, is incinerated and the platinum is ignited. Its weight, multiplied by 0.3939 or by 0.4747, gives the corresponding weight of potassium or potassa.

This method is very advantageous in the determination of potassa in presence of soda and other substances, except ammoniacal salts. It is sufficient to substitute this method of liberating the platinum for that proposed by Corenwinder and Contamine in their method for the determination of potassa in mixtures, such as salines or refined potash.

By the use of magnesium we have obtained exactly 100 per cent. of the potassa contained in potassium sulphate mixed with large quantities of sodium phosphate and sulphate, calcium, magnesium, and iron chloride, and aluminum sulphate, if we employ for the precipitating and washing the chloroplatinate a mixture of equal volumes of anhydrous alcohol and ether.

In presence of bromides, the precipitate produced by platinum chloride may contain more or less bromine replacing an equivalent quantity of chlorine. Still, a determination of the weight of the platinum will give in this case an exact result.

We must not forget to transform the potassium salts into chloride if the acids are volatile, or, in the contrary case, to acidulate with hydrochloric acid.—*Bull. de la Soc. Chim. de Paris*, Series 3, ix and x, p. 602, through *Chem. News*, 1893, 264.

## MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, December 19, 1893.

The meeting was called to order by Prof. Trimble, who nominated Mr. Wm. B. Webb for chairman.

The reading of the minutes of the last meeting was on motion dispensed with.

There being no donations to library or cabinet, the first business was the reading of the paper on the Botany of Columbian Exposition at Chicago, by Henry Kraemer, Ph.G., extracts of which will appear in a future number of the Journal.

The next paper was one upon The Forestry of the Columbian Exposition, by Joseph Crawford, Ph.G. The paper was accompanied with samples of many of the woods dressed and labelled. The uses of the fibre of the *leaves* of the *pinus palustris* with samples of the various articles were also given by Mr. Crawford. They were oakum fibre, coarse and fine, dyed of various colors, and some matting woven from this fibre used for floor covering. These were exhibited by Mr. Wm. Simpson, of Raleigh, N. C.

A paper upon Resin of Podophyllum, by G. M. Beringer, Ph.G., was read, (see p. 9), also Samples of Syrup of *Prunus Virginiana*, U. S. P., 1880 and 1890, the former having 5 per cent. glycerin, the latter 15 per cent. glycerin added to the menstruum before displacement. It would seem to be a disadvantage, as it gave a much greater astringency to the syrup and prevented the solution of the sugar.

Wm. B. Thompson, Ph.G., exhibited samples of milk sugar crystallized, made by the American Lactose Company, of Plainfield, N. J.

The enquiry was made as to the use of Lactose, when it was stated to be used very largely by the manufacturers of homœopathic remedies, and also as a component of infant foods as making a much more close imitation of human milk.

An improved Tablet Machine was exhibited by Mr. Leggoe, the manufacturer. The character of the work performed by it was very much admired, and proved the good qualities claimed for it.

There being no further business, on motion adjourned.

T. S. WIEGAND, *Registrar*.

## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*Salopheu, ein gutes Antineuralgicum und Antirheumaticum.*—Von Dr. E. Lutze, Assistenz arzt am Krankenhaus zu Barmen. Sonder-Abdruck aus Therapeutische Monatshefte. 1893. Juli.

Salophen, a good anti-neuralgic and anti-rheumatic. By Dr. E. Lutze, assistant physician at the hospital of Barmen. Reprint from Therap. Monatshefte. 1893. July.

Notes on experiments with Salophen conducted at the hospital of Barmen.

*Acometric Syllabus.*—Diseases and indications in each which may be met by the use of Diurnals and Diurnal Tablet Triturates. By J. O. Becelaere, M.D., Parke, Davis & Co., Detroit, Mich.



*Formalin-Schering.*

*Diabetin-Schering.*—Schering & Glatz, New York.

Two pamphlets, descriptive of new agents introduced to the medical profession. Under the first name a 40 per cent. solution of formaldehyde is understood, and the second denotes levulose, which has been introduced as an innocuous and palatable sugar for diabetics.

*The Treatment of Myxædema and other Diseases by the use of certain organic extracts.*—Clinical lecture by Hector W. G. Mackenzie, M.A., M.D., etc. Reprint from the *Lancet* (Eng.), Jan. 21, 1893.

*Cretinism Treated by the hypodermic Injection of Thyroid Extract and by Feeding.*—By Edward Carmichael, M.D., Edin., etc. Reprint from the *Lancet* (Eng.), March 18, 1893.

Two reprints published by Parke, Davis & Co., Detroit, Mich., under the name of Biological Therapeutics.

*Contribution à l'Étude des Gommés Laques des Indes et de Madagascar.* Albert Gascard. Paris. Société d'éditions scientifiques. 1893.

Contributions to the study of shellac of India and Madagascar.

This thesis, from the Paris school, shows the observations of the author on shellac from India. The other, from Madagascar, is a new article. The resin obtained therefrom yields by oxidation with permanganate of potash in alkaline solution butyric acid and ammonia. In the wax the author shows the existence of cerylic alcohol, etherized with formic acid or oleic acid, and acids containing nitrogen which are found partially in the free state. The thesis is illustrated by one plate of the shellac from Madagascar.

*Action des aldehydes sur les Phenol Polyvalents. Acétals Aromatiques.* Par Henri Eugène Causse. Paris: Gauthier-Villars et Fils. 1893.

Action of aldehydes on polyvalent phenols. Aromatic acetals.

*Sur l'Éthérification de l'Acide Fluorhydrique.* Par Maurice Meslans. Paris: George Carré. 1893.

On the esterification of hydrofluoric acid.

Two theses from the Paris school containing items principally of pure chemistry.

*Sur un Procédé de Préparation extemporée des Pastilles de Chocolats Médicamenteux.* Par Fr. Gay.

On a process for the extemporaneous preparation of medicinal chocolate pastilles.

*Sur le Tannate de Mercure.* Par Fr. Gay.

On tannate of mercury.

*Sur la préparation et les caractères du Liniment de Rosen.* Par Fr. Gay.

On the preparation and characteristics of Rosen's liniment.

Three reprints from nouveau Montpellier médical.

*Essai d'une Classification des Opérations et Formes Pharmaceutiques.* Par Fr. Gay.

Attempt at a classification of pharmaceutical processes and manipulations.

This is an outline of general galenic pharmacy as taught by the author at the Montpellier school of Pharmacy.

## OBITUARY.

*Dr. Edward Ligon Enders Castleton*, Ph.G., died at Houston, Tex., on Sunday morning, September 17, 1893, aged 33 years. He was born at Baton Rouge, La., in 1860, and was the son of Rev. Thos. Castleton, a Presbyterian minister of English birth, who was lost in making a voyage to Europe in the ill-fated steamer *Shibboleth*, soon after the close of the war. He received his education at Princeton, N. J., and took the degree of bachelor of arts. He learned the drug business with R. Cotter and graduated from the Philadelphia College of Pharmacy in 1879, his thesis being entitled *Percolation with Improved Apparatus*. After his graduation he located in the drug business at Galveston, Tex., and subsequently removed to Houston, where he took up the study of medicine and took one course in the Jefferson Medical College, Philadelphia, Pa., and in 1886 graduated as a physician from the University of Vermont, located at Burlington, Vt., and during the course had charge of the Mary Fletcher Hospital. In 1888, he established himself at Houston, Tex., where he built up a lucrative practice. He was a member of the Texas State Medical Association and of the Harris County Medical Society, besides occupying the position of medical examiner for seven insurance companies and as a physician for a number of fraternal orders. He was also connected with the Order of Elks and the Light Guards, a military organization, and served as its surgeon for a long time. He was highly esteemed for his ability as a physician and as an enterprising citizen.

*William Henry Schively*, one of the oldest importers in the city, died at his residence in Germantown, on Thursday morning, of heart failure. He was born in this city in 1821, and was a son of Henry Schively, at one time a well-known surgical instrument maker. He was educated at private schools, and graduated in the class of 1842 from the Philadelphia College of Pharmacy, afterwards entering the store of Frederick Brown, at Fifth and Chestnut Streets.

Leaving Brown's, Mr. Schively formed a partnership with Ernest Weiss about 1848, under the firm name of Weiss & Schively, for the importing of drugs, dyes and chemicals, with a warehouse on North Front Street. In 1852, the partnership was dissolved and the business continued by Mr. Schively alone at No. 41 North Front Street. His foreign correspondents included the most prominent of the European drug houses, and, until 1866, when he retired from business permanently, he enjoyed almost a monopoly of some branches of drug and dyestuff importation in this city.

Since his retirement from active business life he lived in Germantown. He was for many years connected with the Second Presbyterian Church of that place, and was a member of its Board of Trustees, besides being Treasurer several years. He was a close student of the natural sciences, and took especial interest in meteorology. Mr. Schively survived his wife, who was a daughter of the late Samuel C. Ford, more than 27 years. He leaves one son, Edwin F. Schively, a member of the Philadelphia Bar.

# CLASSES

—OF THE—

## PHILADELPHIA COLLEGE OF PHARMACY,

SEVENTY-THIRD ANNUAL SESSION, 1893-1894.

### JUNIOR LIST.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Aikens, James Phil.,	State College,	Pa.	W. S. Glenn, M.D.
Allen, Augustus Duvall,	Philadelphia,	Pa.	A. W. Duvall, M.D.
Allen, Jr., Benjamin B.,	Smyrna,	Del.	C. A. Eckels.
Anderson, Wm. Rufus,	Philadelphia,	Pa.	W. Nelson Stem.
Anewalt, Ellsworth Quincy,	Catasauqua,	Pa.	Smith, Kline & French Co.
Arcularius, Harry Edward,	Washington,	Mo.	E. W. Gallenkamp.
Armstrong, Walter,	Edenburg,	Va.	L. C. Funk.
Armstrong, William Edward,	North Adams,	Mass.	Special Chemistry.
Arndt, Harry,	Manheim,	Pa.	H. F. Ruhl.
Aszman, Louisa Henrietta,	Cumberland,	Md.	H. L. Smith.
Bahn, Edwin Morgan,	York City,	Pa.	H. H. Hay.
Ball, William Ernest,	Hellertown,	Pa.	Ellwood Ball.
Barbiere, Francis Joseph,	Philadelphia,	Pa.	W. R. Warner & Co.
Barnes, Gus. M.,	Chattanooga,	Tenn.	W. H. Barnes.
Barnitz, Harry L.,	Chambersburg,	Pa.	J. L. Barnitz.
Barr, David Ford,	Philadelphia,	Pa.	B. J. Stathem.
Bartholomew, Claude Lafayette,	Bath,	Pa.	Peters & Smith.
Bauer, Edward Julius,	Philadelphia,	Pa.	L. G. Bauer, M.D.
Beavans, William Eugene,	Enfield,	N. C.	P. Fitch, M.D.
Becker, Irwin Atwood,	Avon,	Pa.	Jos. L. Lemberger.
Bell, Joseph Valient,	Philadelphia,	Pa.	D. W. Flemming, M.D.
Bell, R. A.,	Reading,	Pa.	G. W. Winebrenner.
Benford, Jr., George Washington,	Somerset,	Pa.	G. W. Benford.
Bingman, Harry Clayton,	Jersey Shore,	Pa.	J. Frank Gray.
Booth, James Lofton,	Biloxi,	Miss.	R. C. Cadmus.
Booth, William Henry	Danville,	Va.	J. L. Hagan.
Bostock, Herbert Arthur,	Norristown,	Pa.	C. B. Ashton.
Bowman, Bertram,	San Francisco,	Cal.	L. P. Bowers.
Boyd, Roger,	Atlanta,	Ga.	Geo. F. Payne.
Boyer, John Clinton,	Loyalton,	Pa.	H. C. Eddy.
Brendel, Frederick Charles,	Zanesville,	O.	Henry Mueller.
Brockmann, Frank William,	York,	Pa.	Dale Hart & Co.
Brown, Charles Oliver,	Reading,	Pa.	Harry Swain.
Brown, James Lawrese,	Philadelphia,	Pa.	Finnerty, McClure & Co.
Brown, Roscoe James,	Oxford,	Pa.	W. T. J. Brown.
Brunhouse, Frederick,	York,	Pa.	Wm. Smith & Co.
Bryson, Harry Martin,	Ephrata,	Pa.	Frederick Rapp, M.D.
Bundy, Clinton Thomas,	Barnesville,	O.	J. K. Hartman.
Buxton, Thomas Alexander	Moore, Findlay,	O.	S. C. Meredith, M.D.
Caffrey, J. B.,	S. Bethlehem,	Pa.	J. E. McBride.
Cahill, Andrew Aloysius,	Wilmington,	Del.	John Fahey.
Campbell, Andrew,	Williamsport,	Pa.	Duble & Cornell.
Carman, Harry Alfred,	Philadelphia,	Pa.	Shoemaker & Busch.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Carter, Chas. Franklin,	Dayton,	O.	Harry T. Stover.
Cassel, James Wilson Undercuffer,	North Wales,	Pa.	Wm. R. Childs.
Chalfant, Charles Joshua,	Philadelphia,	Pa.	E. D. McNair & Bro.
Clark, Robert,	Union City,	Ind.	J. P. Frey.
Collins, Harry Thomas,	New York,	N. Y.	Wm. Wilson.
Conger, Horace Glenn,	Manchester,	Ia.	E. J. Conger.
Cope, Edward Kreidler,	Philadelphia,	Pa.	F. H. Cope.
Coppenhaver, Charles Brewster,	Campbelltown,	Pa.	Jonas H. Garman.
Cornell, Horace Hogeland,	Philadelphia,	Pa.	Robert Glenk.
Cornfield, Abraham,	Berlin,	Ger.	H. S. Rhoads, M.D.
Costen, Wm. Adams,	Pocomoke City,	Md.	W. H. Gano.
Cowdery, Martin Franklin,	Philadelphia,	Pa.	
Craig, Ralph Butz,	Allentown,	Pa.	Kennedy & Burke.
Crawford, John Yocum,	Bryn Mawr,	Pa.	A. W. Wright & Co.
Davies, William Richard,	Wilkes-Barre,	Pa.	F. H. Moore, M.D.
Davis, Robert Goode,	Hot Springs,	Ark.	B. W. Goode.
Dean, Guy Stewart,	Kenton,	O.	W. D. Dean.
Deen, Geo. F.,			
DeGraffe, Bertha Leon,	New York,	N. Y.	
DeLorme, John Grenville,	Sumter,	S. C.	J. F. W. DeLorme.
Denton, Robert Ainsworth,	Manchester,	Ia.	Henry C. Smith.
Deibert, Wm. Henry,	Northampton,	Pa.	J. H. Stermer.
Deweese, Wm. Holstein,	Kennedyville,	Md.	Finnerty, McClure & Co.
Dietrich, Pierce Abbott,	Kutztown,	Pa.	M. H. Bickley.
Dill, Benjamin,	Milton,	Del.	W. E. Lee.
Diller, Ira,	Wilmington,	Del.	J. M. Griffen.
Draper, Oscar Carman,	Wilmington,	Del.	W. C. Taylor.
Dudney, Jr., Mansel White,	St. Louis,	Mo.	R. S. Overstreet.
Durand, Arthur John,	Beverly,	N. J.	E. S. Adams, M.D.
Durbin, John George,	Plymouth,	Pa.	R. D. Williams.
Eddy, Volora Doolittle,	Chester,	Pa.	A. L. Castle.
Eldred, Jarvis Harry,	Mahaffey,	Pa.	Dr. Murray.
Fagley, Roscoe Conkling,	Mount Carmel,	Pa.	Dr. E. S. Heiser & Co.
Farley, Levy James,	Chester,	Pa.	W. H. Farley.
Farrell, Martin Edward,	Centralia,	Pa.	W. H. Reed.
Felker, Harry,	S. Bethlehem,	Pa.	W. B. Gleim.
Few, Colin Spangler,	Middletown,	Pa.	C. E. Pease, M.D.
Field, Benjamin Franklin,	Denton,	Md.	W. H. Hobson.
Fitzgerald, Walter Samuel,	Philadelphia,	Pa.	E. R. Gatchel.
Flitcraft, Warren Whitney,	Woodstown,	N. J.	G. M. Andrews.
Foresman, Harry Bastian,	Williamsport,	Pa.	J. Paul Suess.
Foster, William Newell,	Philadelphia,	Pa.	Wm. H. Sauer.
Freethy, Charles Henry,	Hawley,	Pa.	H. A. Plum.
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Gamble, Theodore Littlefield,	Philadelphia,	Pa.	Special Chemistry.
Gillette, Frank A.,	Connecticut.		Special Chemistry.
Goodenough, Harry Davis,	Trenton,	N. J.	Chas. P. Britton.
Grasser, Edward John,	Toledo,	O.	Special Chemistry.
Greenawalt, David Lehman,	Chambersburg,	Pa.	W. G. Greenawalt.
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Griswold, Charles Moss,	Harrisburg,	Pa.	A. Gerhard.
Grotz, Milton,	Bethlehem,	Pa.	John Horning.
Grumbine, Thaddeus Stevens,	Lebanon,	Pa.	Dr. Geo. Ross & Co.
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Haig, Jr., Charles Roberts,	Philadelphia,	Pa.	Chas. R. Haig.
Haines, Charles Henry,	Rising Sun,	Md.	L. R. Kirk, M.D.
Haines, Samuel Woolston,	Camden,	N. J.	E. W. Collins.
Hall, Robert Carson,	Kane,	Pa.	Chas. Leedom.
Hamilton, Walter Scott,	Roseburg,	Or.	S. Hamilton.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Hamilton, William Hamsher,	Shippensburg,	Pa.	J. C. Altick & Co.
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Harlow, Charles Mills,	Nova Scotia.		J. C. Coltman.
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Hodge, William Roseborough,	Columbia, Tenn.		Wooldridge, Irvine & Towler.
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Holshue, Charles Raymond,	Shamokin,	Pa.	Dr. Clark.
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Jackson, Robert MacGregor,	New Glasgow,	N. S.	C. A. Eckels.
Jackson, William S.,			
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Jones, John Comer,	Millville,	N. J.	Dr. C. B. Neal & Co.
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Lanius, Ross McDonald,	Stewartstown,	Pa.	C. Lutzinger.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
LaRue, Willis Leslie,	Dillsburg,	Pa.	H. A. Borell.
Lau, Scott Wolford,	Dillsburg,	Pa.	Frank E. Morgan.
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Levi, Plus Nayes Raud,	Charleston,	W. Va.	J. H. Marity.
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Miller, James Peter,	Ottawa,	Kan.	C. L. Becker & Co.
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Peil, George William,	Honesdale,	Pa.	Jadwin & Spencer.
Pellett, Edmond Burnham,	Scranton,	Pa.	R. W. Cuthbert.
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Poole, Henry Harrison Higbee,	Bristol,	Pa.	J. E. Wright.
Porter, John Morris,	Philadelphia,	Pa.	Francis S. Hughes.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Porter, Wm. Edgar,	Meadville,	Pa.	F. K. Easterwood.
Powell, Charles Deitz,	Coatesville,	Pa.	Wm. C. Thompson.
Punt, Arnold Anthony Joseph,	Philadelphia,	Pa.	W. H. Pile & Sons.
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Reinert, Casper,	Sigourney,	Ia.	B. Franken & Son.
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Richman, Edward Milton,	Deerfield,	N. J.	Geo. B. Evans.
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Scott, Thornton Ford Brainard,	Philadelphia,	Pa.	J. R. Smyser.
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Shoemaker, Clinton Llewellyn,	Allentown,	Pa.	F. Seitz, M.D.
Sisler, Loerey William,	Bridgeport,	Pa.	F. P. Rutherford.
Skay, Edward Joseph,	Philadelphia,	Pa.	Special Chemistry.
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Smith, Rodney,	Saegerstown,	Pa.	S. S. Collem.
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Spidel, Frank Myers,	Bedford,	Pa.	D. H. Ross.
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Stoker, Walter Wilkins,	Philadelphia,	Pa.	Powers & Weightman.
Stout, Edward Clayton,	Philadelphia,	Pa.	G. C. Devine, M.D.
Streeper, Austin,	Norristown,	Pa.	Harry R. Stallman.
Strickler, Jr., George,	Lebanon,	Pa.	S. H. McGowan.

<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Stuart, R. C.,	Houston,	Tex.	Geo. W. Heyer.
Swartz, Calvin,	Wilmington.	Del.	J. S. Beetem.
Tall, Jr., Thomas Anthony,	Chester,	Pa.	Jno. F. Fielding.
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Thompson, Nathan Lincoln,	St. Johnsbury,	Vt.	C. C. Bingham.
Thornton, Thomas Redman,	Union Point,	Ga.	E. F. Kessler.
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Wayne, Edward Fisher,	Philadelphia,	Pa.	Special Chemistry.
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Whiteley, Edward Albert,	New Hope,	Pa.	Geo. M. Shamalia.
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Wissman, Herman Bayard,	Philadelphia,	Pa.	H. T. Hayhurst.
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Young, Horace Greely,	Bristol,	Pa.	J. K. Young.
Young, Warren Ray,	Lykens,	Pa.	A. G. Stanley.
Ziegler, John Clayton,	York,	Pa.	B. S. Gilbert.
Zipp, Charles James,	Utica,	N. Y.	C. H. Jones.
Zook, John Noah,	Coatesville,	Pa.	Geo. W. Davy.

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Atkins, Frank Hean,	Lebanon,	Pa.	James T. Shinn.
Aughinbaugh, Wm. Culbertson,	Hagerstown,	Md. D.	C. Aughinbaugh & Son.



<i>Name.</i>	<i>Place.</i>	<i>State.</i>	<i>Preceptor.</i>
Bacon, Edwin Gray,	Freehold,	N. J.	Chas. A. Bye.
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Bailey, John Henry,	S. Bethlehem,	Pa.	George Freshell.
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Barr, Elwyn Paul,	Pine Grove,	Pa.	C. D. Fröh, M.D.
Barr, Robert Hamilton,	Philadelphia,	Pa.	Jos. McKee.
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Beavers, Frank Washington,	Scranton,	Pa.	G. W. Jenkins.
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Brown, James Reed Logan,	Greensburg,	Pa.	S. P. Brown.
Brown, Wilbur Beers,	Jersey Shore,	Pa.	B. E. Staples.
Brunier, George Franklin,	Philadelphia,	Pa.	Bas. Bohn.
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Campbell, Thomas Palmer,	Philadelphia,	Pa.	Funk & Groff.
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Christ, George Raymond,	Pine Grove,	Pa.	Geo. W. Schools.
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Claudy, Robert Blean,	Newville,	Pa.	B. F. Emrick, M.D.
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Conard, Norman Shoemaker,	Philadelphia,	Pa.	T. E. Conard, M.D.
Craig, Harvey Alfred,	Galesburg,	Ill.	
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# THE AMERICAN JOURNAL OF PHARMACY

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*FEBRUARY, 1894.*  
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## ANALYSIS OF PYCNANTHEMUM LANCEOLATUM, AND NOTES ON ITS ETHEREAL OIL.

BY HAROLD C. BARKER.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.  
No. 129.

This analysis was made in the Chemical Laboratory of the Philadelphia College of Pharmacy, at the request of Prof. Henry Trimble, to whom the writer is indebted for many suggestions, as well as a continual supervision of the work. No published analysis of this plant has been found by the writer, but an examination of *P. linifolium*, a nearly allied species, was made by Dr. Charles Mohr, in the year 1876, the results of which were published in the Proceedings of the American Pharmaceutical Association, Vol. 24, p. 513.

The material used in the present analysis was collected in Delaware County, Pa., during the latter part of July and the earlier part of August, 1893, when the plant was in flower. In collecting, the plants were cut off a few inches above the ground.

The material was allowed to dry without exposure to sunlight or artificial heat, it thereby losing about 60 per cent. of its weight. For analysis, a sample was reduced to fine powder, of which 50 grammes were taken.

The results of the analysis may be tabulated as follows :

	Per Cent.
Moisture, . . . . .	8'96
Ash, . . . . .	5'77
Benzol extract :	
Ethereal oil, . . . . .	1'47
Substance not volatile at 110° :	
Soluble in hot alcohol, . . . . .	1'20
Insoluble in hot alcohol, . . . . .	72
	<hr/> 1'92
	3'39
Ether extract, . . . . .	'90
Alcohol extract, . . . . .	1'45
Aqueous extract :	
Mucilage, . . . . .	'70
Glucose, . . . . .	'37
Undetermined, . . . . .	4'60
	<hr/> 5'67
Alkaline aqueous extract :	
Albuminoids, etc., precipitated by alcohol,	1'26
Undetermined, . . . . .	4'47
	<hr/> 5'73
Acid aqueous extract :	
Pararabin, . . . . .	'43
Other organic substance, . . . . .	'72
	<hr/> 1'15
Inulin, . . . . .	'35
Lignin, etc., removed by chlorine water, etc., . . . . .	23'95
Cellulose, etc., . . . . .	36'09
Loss, . . . . .	6'59
	<hr/> 100'00

The moisture was estimated by drying at 110°; the amount stated consequently includes a part of the ethereal oil.

The benzol extract was of an olive green color, and on evaporation of the solvent, left a semi-solid residue, having the odor of the ethereal oil. This was first dried at 100°, and weighed; then brought to very nearly constant weight at 110°, the intention being to take the difference between these two weights as the weight of the ethereal oil; but, as the percentage thus found was far lower than the percentage of ethereal oil actually obtained in distilling a quantity from the air-dry herb, it being less than one-fifth as great, the latter was considered more nearly correct, and is the percentage stated in the table.

The residue non-volatile at 110° was treated with hot absolute



alcohol, and the dark green solution filtered while hot. The residue left undissolved consisted mainly of a dark green, rather soft and somewhat elastic substance, soluble in chloroform, resembling caoutchouc; partly, also, of a grayish green substance of different consistency, perhaps difficultly soluble in hot alcohol, as the alcoholic filtrate, on cooling, deposited a little of a substance similar in appearance and possibly identical. Besides this substance, the alcoholic solution, after the evaporation of the larger part of the solvent, deposited a dark green substance, leaving the supernatant fluid almost colorless. The whole of this alcoholic extract was finally dried and weighed.

The ether extract left on evaporation a dark green residue, which was dried and weighed. It was subsequently treated with acidified water, slightly warm, and the filtered liquid tested for alkaloids and glucosides, with negative results. The residue, after the treatment with acidified water, was treated with alcohol, which partly dissolved it, forming a dark green solution, and leaving undissolved a dark green residue.

The alcohol extract left a yellow-brown residue on evaporation. It was treated, after drying and weighing, with cold water, with which it formed a turbid mixture extremely difficult to filter. A small quantity of tolerably clear filtrate, which was acid to litmus, gave the following reactions:

With solution of ferric chloride, and solutions of ferric chloride and ferrous sulphate, mixed, dark brown precipitates, perhaps slightly greenish; no inky coloration.

With potassio-mercuric iodide solution; no precipitate.

The aqueous extract was yellow-brown in color, slightly acid to litmus. Total organic matter was estimated by evaporating one-tenth (25 cc.) to dryness, and weighing; the ash was then estimated, and its weight deducted. This ash was found to contain considerable phosphoric acid. The mucilage was estimated in 25 cc., by precipitation with two volumes of alcohol. After drying and weighing, the ash was estimated and deducted. It amounted to a trifle over 21 per cent. of the entire precipitate.

To 100 cc. was added an excess of lead acetate solution, the precipitate filtered off and washed, the filtrate and washings freed from lead with hydrogen sulphide, and, after driving off the excess of hydrogen sulphide by heating, the fluid was divided into two equal

parts; one of which was made alkaline with potassium hydrate solution, and the glucose estimated with Fehling's solution; the other was acidified with one per cent. of hydrochloric acid, boiled, made alkaline with potassium hydrate solution, and heated with Fehling's solution; it, however, reduced slightly less than the first part.

The alkaline aqueous extract was of a reddish-brown color. To estimate total organic substance extracted, one-tenth (40 cc.) was evaporated to dryness, and weighed; the ash then estimated and deducted. To estimate albuminoids, etc., 40 cc. were acidified with acetic acid, and three volumes of alcohol added. The precipitate was dried and weighed, and its ash estimated and deducted.

The acid aqueous extract was obtained by digestion in the cold with water containing about one per cent. of anhydrous hydrochloric acid. The total organic substance in the extract was estimated in an aliquot part by neutralizing with sodium carbonate, evaporating to dryness and weighing; the ash being then estimated and deducted. To estimate pararabin and calcium oxalate, one-tenth (50 cc.) was neutralized with ammonia water and two to three volumes of alcohol added. The precipitate was dried and weighed; then gently incinerated, and its ash calculated from calcium carbonate to calcium oxalate. The amount of calcium oxalate found was equivalent to 0.38 per cent. of the air-dry herb. The weight of the calcium oxalate was subtracted from the weight of the precipitate, the remainder being taken as the weight of pararabin.

The residue of the plant after the treatment with acid water, and washing, was boiled with water. To one-half of the filtered liquid was added about one per cent. of hydrochloric acid; it was then boiled for from three to four hours, rendered alkaline with potassium hydrate solution, and the sugar estimated with Fehling's solution. The amount found was calculated to starch or inulin; and, as the original solution when tested for starch with iodine gave a negative result, the amount is stated as inulin.

The washed residue from the treatment with boiling water was dried and weighed; then treated with chlorine water, and washed first with water, then with a weak solution of sodium hydrate until the washings were almost colorless, and finally again with water. It was then dried and weighed, the ash estimated in a portion, calculated to the whole amount, and deducted; the amount remaining

being equivalent to the percentage of cellulose, etc., stated in the table.

A portion of the original powdered herb was tested for tannin by extraction with cold water; a brown solution being obtained, which gave brown precipitates with ferric chloride solution, and with a mixture of ferric chloride and ferrous sulphate solutions; and a light brown precipitate with solution of gelatine containing alum, but a similar precipitate was obtained with solution of alum alone.

The residue from the above extraction with cold water was boiled with water, and the solution tested with iodine for starch, which was not detected.

Special tests were also made with some of the original powdered herb, for alkaloids and glucosides, with negative results.

In drawing conclusions from the analysis, the absence of tannin and starch, and the small quantities of inulin and sugar may be noted; also, the failure to find either alkaloids or glucosides, as above stated.

#### NOTES ON THE ETHEREAL OIL.

The oil was obtained by distilling the material, broken into short lengths, with water, in which it was soaked overnight before distilling. The aqueous portion of the distillates was returned to the still, with the exception of that obtained in the last distillation, which was shaken out with benzol; the separated benzol solution left, on evaporation of the solvent, a small quantity of oil, which was added to the main quantity.

The total amount obtained weighed about 53.47 grammes, which was equivalent to about 1.47 per cent. of the air-dry material.

The following of its properties were ascertained:

Color pure yellow, of medium depth.

Odor considerably resembling that of pennyroyal.

Specific gravity, at 15° C., .9361.

The boiling points were determined by heating on a sand bath in a test-tube, the thermometer bulb being completely immersed in the oil. The temperature was allowed to rise slowly.

At 150°, boiling commenced, very gently.

At 205°, the ebullition had become rather more brisk, but still very gentle.

Between 210° and 215° it became much stronger.

The temperature finally rose to 216°, but did not then remain

stationary; the oil continued to boil for over an hour, with the temperature varying between  $212^{\circ}$  and  $216^{\circ}$ ; the heat was then removed. During the heating, the oil became amber-colored.

When a vessel containing a quantity of the oil was immersed in water at a temperature of from  $10^{\circ}$  to  $12^{\circ}$ , the oil became clouded and nearly opaque. A quantity of the oil was placed in a test tube, which was then sunk into a mixture of snow and salt. The oil first became cloudy, afterwards, a small quantity of a white substance, separated in small, cottony masses, the liquid becoming again clear. The oil did not increase in viscosity to any noticeable extent. On removing the test tube from the freezing mixture, the cottony masses rapidly disappeared. They were probably due to the presence of a little water dissolved in the oil, especially, as the portion of oil which had been boiled in determining the boiling points, when cooled with snow did not lose its transparency, nor did any substance separate.

The following color reactions, etc., were observed:

One drop of oil with three drops of concentrated sulphuric acid gave a red-brown color, immediately. To one drop of oil dissolved in about 1 cc. of chloroform, two drops of sulphuric acid were added. The acid acquired a red brown color, while the chloroform remained colorless.

One drop of oil with five drops of strong hydrochloric acid gave no color.

One drop of oil with about 1 cc. of alcohol, and one drop of hydrochloric acid, gave no color.

One drop of oil with four to five drops of fuming nitric acid gave a red-brown color.

A fragment of iodine was added to a few drops of oil, which acquired a dark-red brown color, but there was no energetic action.

To five drops of oil, .05 gm. of picric acid was added. This dissolved readily and completely in the cold, forming a solution having a brownish-yellow color, which changed to yellowish-green.

A portion of the oil was treated in the following manner:

15 cc. of the oil were mixed with 12.5 grammes of sodium hydrate, 40 cc. of absolute alcohol, and 7 cc. of water, in a flask, which was connected with an inverted Liebig's condenser, and the contents heated to boiling on a water-bath for over two hours. To the resulting deep red-brown fluid was added an equal volume of

alcohol, a current of carbon dioxide passed through, and the precipitated sodium carbonate filtered out.

A portion of the alkaline filtrate was mixed with about five volumes of water, the result being a turbid fluid of a reddish-ochre color. This was agitated with ether, which removed the substance causing the turbidity, forming a red-brown solution, which on evaporation, left a red-brown, transparent, soft, resinous residue, having an odor somewhat resembling that of the original oil. This residue slowly hardened, in thin layers forming a varnish-like film.

The alkaline fluid, after having been well shaken out with ether, the operation being repeated several times, was of a brownish-red color, and very nearly clear. It was acidified with dilute sulphuric acid, which caused a yellowish-brown turbidity, the substance to which it was due soon largely coagulating into soft red-brown masses. The whole was shaken with ether, which readily dissolved the red-brown masses, forming a red-brown or brownish-red solution. The acid fluid became clear and nearly colorless. The ethereal solution left, on evaporation, a transparent, resinous substance, at first soft, but slowly hardening, with little or no odor.

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## UNITED STATES FORESTRY AT THE FAIR.

BY JOSEPH CRAWFORD, PH.G.

Read at the Pharmaceutical Meeting, December 19, 1893.

Forestry, in the proper sense of the word nowadays, means the study of forest trees in their direct relation to man, and the care, protection and perpetuation of them on their native as well as cultivated grounds.

As Mr. Fernow, of Forestry Association, says, "The forest primeval is our most valuable inheritance.

"It is the ready cash of Nature's bountiful promise for our future. Of all the natural resources reserved for our use *it* is the most directly useful, for in the forest ready to hand without further exertion than the mere harvesting, is the greatest variety of material applicable to the needs of man, the means to satisfy every direct want of life.

"And if left to herself, without interference of man, Nature would keep entire, with few excepted, all localities under forest cover.

"It is only when man interferes that the tendency of Nature is either frustrated or turned to advantage for the objects of man. If

the latter, then we may speak of forest management, and we understand by management the bestowal of care, giving direction and applying economy in the use of natural resources."

And the Columbian Exposition managers very generously erected a building of liberal proportions in which could be displayed, in their many conditions, "The Trees of the World."

It certainly was one of the most unique on the grounds, and it is to be very much regretted that its location in an extreme corner by the Lake and erection so close to other buildings and hidden by the intramural railway, that the beautiful rustic effect was lost, except viewed from the Lake. Built in the form of rectangle, 200 x 500 feet, and surrounded on all four sides by a veranda, supporting the roof of which is a row of columns composed of tree trunks. arranged in threes, each 25 feet high, the bark remaining on. One of these, the central, was from 16-20 inches in diameter and the outside two from 9-12 inches in diameter. These were characteristic trees of different States, Territories and foreign countries, and each specimen properly named, common and scientific terms.

The sides of the building were constructed of slabs with bark removed, and the roof thatched with tan and other barks.

The main entrances were elaborately finished in different kinds of wood, the material and workmanship being contributed by several prominent lumber associations.

Interior was very plain, neither paint nor ornamentation appearing anywhere, unless we except those heterogeneous masses in niches which were the homes of those saucy individuals, the omnivorous and omnipresent English sparrow—*Passer domesticus*.

Of the trees forming the colonnade we have no record excepting those furnished by Pennsylvania and Minnesota, and these will be described under State exhibits. The following States, Territories and countries represented in this building were: Argentine Republic, Arizona, Australia, Brazil, California, Canada, Connecticut, Colorado, Florida, France, Germany, India, Indiana, Idaho, Japan, Kentucky, Louisiana, Massachusetts, Mexico, Michigan, Minnesota, Missouri, Nebraska, New York, North Carolina, North Dakota, Oregon, Ohio, Paraguay, Pennsylvania, Russia, Siam, Spain, Phillipine Isles and Cuba, Trinidad, Utah, Virginia, Washington, Wisconsin and West Virginia.

This building was always overlooked in a description of the Fair

Buildings, and Transportation given the credit of being the only one that was not of regulation white color. Will pardon all such shortsightedness from its situation and feel sure that had it been in any other location of the grounds much less difficulty and embarrassment would have been experienced in finding it than was the lady's lot, for instance, who was sure the "Lagoon" was in the Liberal Arts Building.

And at same time its pristine grandeur would have shown out nobly towards the Roman and Castilian architecture, so greatly admired by every one, in the other buildings.

But that is not the "pith" of the argument, you say? Well, then, will let you have the "wood" and make what you can out of it. On entering the hall the eye was startled by the vast accumulation of timber representing all stages of growth, as well as of manufacture. Then from gazing on the monster Redwoods of California our eyes fall on the top of the little rustic bower from Connecticut, where we behold the only genuine nutmegs grown in the State, that are worth speaking about. It was very pleasing, indeed, to find this old-time industry revived and good sized and scented specimens swinging aloft in this first temple of World's Forestry.

May we not ask whether they did not utilize some of the motive force of the great Ferris Wheel to assist in turning out some of these quaint necessities (?) of the kitchen?

These, no doubt, assisted those heavy bills of fare in producing indigestion at the Exposition, and venture to say were the direct cause in the Ostrich Farm of Gail Hamilton's discomfiture and her sudden stampede down the Midway, after some Yankee. But even here Ostrich alacrity was no equal for Yankee tact.

Charity begins at home, and Pennsylvania, in order to show her sweet character to sister States and visitors, bestows a Sugar Maple section on the mundasylvatic group in the centre of the building.

Around the Lake front colonnade we furnished the following nine trees as pillars in the triple arrangement to support the roof, namely: American Linden (*Tilia Americana*), Sugar Maple (*Acer Saccharinum*), Black Cherry (*Prunus Serotina*), Green Ash (*Fraxinus viridis*), Sweet Birch (*Betula lenta*), Chestnut (*Castanea dentata*), American Beech (*Fagus ferruginea*), Eastern Hemlock (*Tsuga Canadensis*), and White Pine (*Pinus Strobus*).

The general exhibit, to say the least, was small when we consider

the space secured and the excellent reservations we had to draw upon.

There were 68 samples of forest trees in sectional blocks, averaging over 4 feet in length and an average tree diameter. These were half polished and half natural condition and typical of our trees as they appear throughout the State. Also 95 specimens native of Centre County, 50 framed water colors of forest leaves and 60 framed photographs of Pennsylvania trees. Another collection contained some 693 woods of the world that had quite a commercial interest attached to them.

Michigan claims first position among the States in the lumber business, and her exhibit of forest trees was a very creditable one, while the Agricultural College took a step in the right direction of forestry movement, by showing insect enemies and their ravages.

As one evidence of lumber industry in the State, in 1881, their mills sawed lumber sufficient to load a train of cars 2,470 miles long, each car carrying 10,000 feet.

Another evidence of the size of this industry was a load of 50 white pine logs still on the sleds, aggregating 36,055 cubic feet, measuring 33 feet 3 inches in height and weighing 144 tons. This load, however, was adjoining the stock pavilion and not in Forestry Hall.

The Alpena Sulphite Fibre Company showed their paper fibre in various processes of manufacture.

Next in rank to Michigan is Oregon, which "claims to have 25,000 square miles of internal and coast line covered by a growth of timber, the like of which, in diversity and size, no similar space on earth's surface can boast."

Among the exhibits was the State's collection of commercial woods, a spruce log, 10 feet diameter, 25 feet from the butt, and a small house built of 35 varieties of natural timbers.

Chief of these is the Douglass, or Oregon Pine (*Abies Douglassii*), Red Fir or Red Hickory, one of the grandest trees of the continent and one of the most important to commerce, frequently reaching 200 and 300 feet in height. This is called a pine, nevertheless it is a spruce.

Their principal Pine is the Oregon Yellow (*Pinus ponderosa*), and their principal Firs the Western Balsam (*Pina grandis*) and the Noble Fir (*Pina nobilis*), which frequently reaches 200 feet.

They have 3 oaks in Oregon as useful as ornamental, which are



different species altogether from ours, but delight in the same common names, as, for instance: their White Oak is *Quercus garryana*, not our "Alba;" Black Oak is "*Kelloggii*," not our "nigra," and Live Oak is "*chrysolepis*," not our "*virens*."

And in their Maples they have two widely different from ours and also each other. The Broad Leaf, *Acer macrophyllum*, used for household furniture, and the Vine Maple, *Acer circinata*, so small as to be of no value but for barrel hoops.

Oregon Grape (*Berberis aquifolium*) figured prominently also as a wood. Alongside of Oregon's exhibit was that of Washington's, and it consisted of 44 species, many of which were peculiar to the State, while others common both to Oregon and Washington. One fir log in particular was 24 feet long by 6 feet square.

The State Building was attractive from its novel construction. The superstructure rested on a foundation of large fir logs, squared, reaching nearly to second story, all donated by large lumber manufacturers.

The tall flag pole in front of the building was 238 feet high and consisted of one single tree, a fir and they claim it to be the largest flag mast of its kind in the world. Washington contributed all the flag poles on the grounds. There was a fine display of woods or timbers in this building, but for lack of space they could not be shown to advantage.

To California must go the glory of the only State furnishing those Forest Giants, the Redwoods, *Sequoias sempervirens* and *gigantea*, for who will ever forget the delight on beholding that magnificent room in the Woman's Building, furnished throughout from these woods; or, the sensation either, of having his chest "stove in" while making the rounds of that Redwood Bark trunk placed in the centre of the Government Building and furnished with but one small entrance.

Against southern end of Forestry Hall, a varnish firm exhibited the largest plank in the world, made from one of the Redwoods, presumably *Sequoia gigantea*.

Dimensions of plank were 16 feet 5 inches in width, 12 feet 9 inches in length and 5 inches thick.

The tree from which it was obtained was undoubtedly 1,500 years old, 300 feet high and 35 feet in diameter. The plank was cut from a section 28 feet above the base.

Arizona had a collection but not large enough to attract my attention.

Colorado had a well selected and well filled collection of her trees, carefully arranged, so also had Connecticut, with that crowning glory of hers, the "Mystic Myristica," swinging aloft over our heads, in that rustic bower of curiously formed branches.

Quaintness characterized her exhibit, as many odd forms of trees and twigs did silent witness to the latent genius of the State.

Looking down list of States alphabetically, notice but two I's, "eyes," and both capital ones, too—Idaho and Indiana.

The former having but a small space allotted, showed well, however, some sections of trees, planks of red cedar, tamarac, yellow and white pine and several minor articles of little interest to general public, while the latter had specimens of native trees and maps showing their distribution throughout the State.

Kentucky had a large space and very creditably overflowed it. Most of the timbers showing transverse sections of good sized trees. The commissioner was a very agreeable man of the Kentucky Colonel type and whose fund of information far exceeded stock on exhibition.

While conversing with him on Chicago Day, he said it was amusing for him to see the great amount of satisfaction, crowds of people derived from passing through the hollow trunk of a large walnut tree.

This State exhibited more black walnut material than any of the others; also took the lead in curly maple and wavy white poplar (*Liriodendron tulipifera*).

Louisiana showed sections of her timbers, some cypress planks 4 feet wide, magnolia planks, a pavilion of Louisiana woods and gray and black mosses, and some cypress knees.

Massachusetts displayed a goodly number of her trees and so did Minnesota, who besides her fine wood collection deserves little mention as the only State beside Pennsylvania that made special mention of her pillars under the colonnade.

They were White Pine (*Pinus strobus*), Rock Elm (*Ulmus racemosa*), and White Oak (*Quercus alba*), with these side supports of smaller diameter, Butternut (*Juglans cinerea*), Black Ash (*Fraxinus sambucifolia*), White Maple (*Acer dasycarpum*), Basswood (*Tilia americana*), Yellow Birch (*Betula excelsa*), and Red Oak (*Quercus*

rubra). Missouri, Nebraska, New York, North Carolina and Ohio each had good collections of representative woods, North Carolina's arrangement being particularly fine and well adapted for showing each specimen. They seemed of unusually large size in diameter and if typical of her forests, the Pacific States of Oregon and Washington have a good-sized rival on the Atlantic border. Large photographs of forest scenery accompanied the sections; also concise description of each tree and its uses.

North Dakota and Utah each had large sections to illustrate this timber without reference to any particular species or family of them.

The Disston Land and Drainage Company displayed typical Florida trees in large sections.

Kansas, a walnut log, 48 feet long, and 78 inches diameter base and 48 inches at top.

Virginia showed collections of several counties, cleverly prepared, while her neighbor, West Virginia, showed not only a great variety of her types of trees, but also mounted specimens of insects and their havoc with trees.

Among New York exhibitors was Prof. Hough, who had the finest display or arrangement for showing the life history of the tree that there was in the building, and easiest of study. One system was that of 4 winged standards of glass covered mounted specimens of the tree in its infancy, roots, stem and first or few pairs of leaves on one sheet of herbarium paper, another showing flowers and fruit, a third, probably, typical leaves and the fourth, paper would most likely have a diseased specimen or one showing insect havoc, or elegant photograph of specimen area.

His arrangement of woods showed them in pieces of about 4 feet high, an average diameter of the tree, vertical sections as well as transverse.

The Jesup Collection of N. Y. Museum Nat. History, New York city, was represented in miniature by sections principally longitudinal about 12 x 14 or 16 inch but with a card history attached, making an interesting exhibit.

This and Michigan and Nebraska were the only States which showed any attention to this matter of insect enemies outside of Government display.

Wisconsin exhibited over 70 varieties native, also many fine timbers for furniture, notably sandbox willow, curly oak, canoe birch,

speckled alder, scarlet thorn, red basswood, hard maple and elm freaks, curly birch, bird's eye maple, etc.

With the mention of the large room, called the Southern Pine Vestibule, from its construction, I will close on our home exhibit; beg your pardon, I shall ask you to step out to the "Big Tree Inn" and up to its bar of what I should say was composed of one entire piece of Oregon Fir, about 4 feet square and anywhere from 60 to 100 feet long. Nobody ever could tell 5 minutes after he was in there, just how long it was.

Yes, but there remains Illinois exhibit, which was not in Forestry, but her own State Building, and nothing but praise can be said for her that she fairly outdid herself.

These were the States that had sufficient interest in the forests and forest industries to show them to the world, and we hope that our foreign friends were as well pleased with the result as we ourselves were.

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## AMERICAN MILK-SUGAR.

WILLIAM B. THOMPSON.

Read at the Pharmaceutical Meeting, December 19, 1893.

As a contribution to the College Collection of Specimens, there is herewith presented some crystals of milk-sugar of unusually large size and attractive appearance. These are the product of the American Lactose Company, operating at Plainfield, N. J. These crystals, do not, of course, present the whiteness of those of the "so-called" cob-sugar—crystallized on flexible sticks, instead of on strings, as in the manner of rock, or sugar candy. This modified appearance is due, as is well understood, to the contained water of crystallization drying in this shape being quite unpracticable, without involving loss of form. This specimen is nevertheless *pure*, and reflects a great degree of credit on this attainment in American enterprise and industry. It is one of the developments of industry and gain fostered by a protective tariff, protecting *all*, not the *few*—the duty now imposed upon milk-sugar stimulating American enterprise in this as well as in numerous other directions. When we reflect that the thrift of a nation, with the careful utilization of its natural products, and the development of all its resources constitute the wealth of that nation, we can see without further reasoning how important it is that the bountiful supplies which Nature affords are

placed within the reach of man to supply his wants and to furnish his luxuries. No country can equal America in the extent of fertile agricultural area, or in the immensity of its dairy products. How much of the latter has heretofore been consigned to waste, one can almost calculate when the amount of the output of milk-sugar of the numerous plants now engaged in this manufacturing industry is estimated, and this branch of enterprise is but yet in its incipency!

There are, however, other facts in this connection upon which the American student of pharmacy and chemistry may reflect with some degree of profit; one of which is, as these enterprises become new in this country, are conceived and put into execution, a difficulty is invariably met with at the outset. This consists in the want of expert knowledge, and of experience in the lines under experiment and investigation. As a consequence, it becomes necessary for success to fall back as well as rely upon foreign skill and talent to achieve the needed results. This is evidenced in the many industrial establishments of our country, where the science of the chemist and the art of the pharmacist are ever in requisition. Now, whilst pharmacy may and does constitute a distinct branch of science, it nevertheless reaches out in many collateral directions—and all these may be pursued even whilst pharmacy is sustained as a chief occupation. If there is a plethora of pharmacists there, never a plethora of practical knowledge in those branches of science which are so closely interwoven with and allied to the pharmaceutic art. Therefore, it seems well to direct the attention of the younger aspirants to these avenues of employment and remuneration and to stimulate those who are about to pursue their favorite study and to turn their thoughts and time to a more diversified study of the directions which surround them. This is urged to the end that pharmacy may not only be usefully advanced in its sphere, but that its votaries may gain eminence and fame in the direction of knowledge applied to art, and above all, that to the beginner it may be viewed as an open door, through which they may successfully enter the arena of more diversified pursuit.

*December 19, 1893.*

THE WORLD'S COLUMBIAN EXPOSITION FROM A  
BOTANICAL STANDPOINT.<sup>1</sup>

BY HENRY KRAEMER.

The botany of the World's Columbian Exposition may be said to have been a subject of at least some interest to everyone that visited the Fair. And while attention has been called to the fact that in only three places in the great Exposition did one see the placard with the name "Botany," still it was important and noteworthy that three buildings were entirely devoted to the exhibition of some of the products of the vegetable kingdom and that all of the others contained more or less exhibits of a botanical nature. Much may be said regarding the momentary inspiration one received upon beholding the building and grounds for the first time. It might be compared to that of an ideal realized and personified. In reality it was akin to that which one receives upon beholding a young man (say on his commencement day) whose powers are not only strong, but whose pecuniary position is as strong and whose every action is a story of ideal endeavors and splendid successes.

In endeavoring to select that which will be of interest to us and of bearing upon our subject to-day we must forego mention, certainly in detail, of those objects which are likely to be seen again or are of a purely external character. For convenience let us first look into that building which was one of the most conspicuous at the Exposition—the Agricultural Building. In this building 37 of the States of the United States and 35 foreign nations had exhibits. The nations and States participating utilized their principal products in the construction and ornamentations of their pavilions. The medicinal specimens were not, generally speaking, of much interest, not so much because these were not interesting exhibits, but mainly because the arrangement, labelling and nomenclature was so poor, that it was difficult without considerable labor to obtain even the slightest information relating thereto. Mention may be made of Eucalyptus oils; an assorted Cape gum, being an exudation from *Acacia horrida*; a solid block of Cape Aoles, 18 inches wide, 2 feet high and one foot thick. Several blocks of honey and wax of about 50 pounds each. Rolls of cinnamon with cinnamon peelers tools.

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<sup>1</sup> Abstract of paper read at Pharmaceutical Meeting, Dec. 19, 1893.

More attention was paid to the agricultural and economic side of botany than to the medicinal side. Woods of all kinds were displayed, being worked up and polished to show their especial adaptability to all kinds of ornamental and useful work. An interesting product was a quantity of cassava bread (see Amer. Jour. Pharm., 1891, 391). Canada exhibited a section of *Prunus virginiana*, 44 inches in diameter. Ceylon exhibited tea and coffee from more than 100 estates, one sample of tea being valued at \$175 per pound. Germany exhibited the processes for, and products resulting from, the manufacture of sugar from the beet-root; of spirit from potatoes; of starch from potatoes; of starch sugar by the inversion of potato-starch; of the manufacture of pressed yeast; also those of malt making, beer brewing and vinegar manufacture. These are industries involving botanical questions and belong to the department of physiological botany. The time is fast approaching when botany will be recognized by the biologists and chemists to its fullest extent and given credit for all its work. That this is already the case with the biologists, we need but to recall the recent discussions and examine the prospecti of some of our leading universities during the past year. In some of the "chemical" industries biologists (botanical biologists) are absolutely necessary for the production of good products. An object of special interest in the German exhibit was a pavilion of chocolate 30 feet high and made of 30,000 pounds of material!

The Japanese showed a spirit of enterprise which was possibly unsurpassed by any country or State. Rice was abundantly shown in all its varieties. The glutinous rice is chiefly consumed by making it into the form of cakes, called "Mochi." Upland rice or "Okato" is, generally speaking, far inferior in its taste when cooked to that of the ordinary rice grown in paddy fields, although there is but little difference between them in chemical composition. Many of the products of rice were exhibited. An interesting cultivated plant was Yegoma (*Perilla ocimoides*), which yielded 17 per cent. of a drying oil, which has the property, when mixed with other oils, that solidify in the cold easily (as Rape seed) of preventing their freezing. The products of Haze fruit and Lacquer fruit were also shown.

Among fibres may be mentioned *Mao fibre*, the production of *Boehmeria nilvea* and *Banana fibre*, the product of *Musa basjoo*.

The fibre of Mao excels that of hemp by its flexibility, fineness and high lustre. The finest quality is consumed in the weaving of costly cloth, which is highly esteemed by the Japanese for summer dresses. The poorer quality being used for making fishing nets, angling lines, etc.

Among barks used in paper-making were exhibited the *Paper Mulberry* (*Broussonetia papyrifera*), *Mitsumata bark* (*Edgeworthia papyrifera*) and *Ganpi bark* (*Wickstrœmia canescens*). Specimens of raw and bleached bark with specimens of paper were exhibited. The Ganpi bark is valued, especially in producing a smooth, fine and high lustred paper. Japanese paper is usually made from two or more raw materials, and is very seldom prepared from a single material. Moreover, the fibre of Ganpi and Mitsumata are not strong enough singly, yet they are extensively used with other coarse raw materials in order to give the tenderness, smoothness and lustre to paper of low quality.

Tobacco from 9 prefectures were exhibited. The product of Kokubu is most highly esteemed by the Japanese. There were also exhibited some fine specimens of peppermint oil and menthol crystals. These products are yielded by *Mentha arvensis*, a plant cultivated from a very remote age in Japan. All the specimens exhibited came from the Yamagata prefecture, from which the exported products are also obtained. In cultivating the plants, the land is well prepared in the month of October, and the roots separated from the stubble are cut to lengths and planted in well prepared soil in rows. In the next spring a dilute ordure is given the plants when they grow vigorously. The first cutting is done in the middle of July, the second in the middle of September and sometimes, but rarely, a third cutting is made in some districts. The plant is dried under a shed without exposing to the sun and carefully kept for future distilling. The best time for distilling is said to be the middle of January.

Among edible dried products of plants may be mentioned the dried sweet potato. For preparing this a certain quantity of cleanly washed potatoes are placed in a suitable basket and immersed in boiling water for a short time, then removed from the basket, cut into thin slices, spread over mats and exposed to the sun for two or three days. A superior quality is obtained by peeling off the skins before slicing. Other dried products were exhibited.



Summing up the products exhibited in this building we mention that tobacco in all its forms was displayed with machines and appliances for curing it and manufacturing cigars, cigarettes and snuff, as well as insecticides and methods with appliances used to endeavor to stay the ravages of the tobacco worm and other parasites. Cotton on the stalk was shown in all its varieties; with methods of planting and cultivating as well as the methods and machines used in picking, ginning and baling it. Likewise hemp, flax, jute, ramie and other vegetable fibres were displayed in their primitive forms and in all stages of spinning. Malt liquors with machinery and processes employed in fermenting, distilling, bottling and storing these beverages. Models of breweries in operation. Among vegetable oils were cotton-seed, olive, rape-seed, linseed, palm, etc., with the seeds and seed cakes as residues. Starches were exhibited with processes of manufacture from all sources, from cereals, tubers, arrow-root, plantain, cassava, zamia, manioc, tapioca, sago, pearl, flour, etc. Sugar-cane, beet-root and sorghum were exhibited in the raw and natural condition with the processes which finally yielded the commercial syrups and sugars. Sugars from palms, maple and milk were exhibited. To the agriculturist the different State exhibits were of interest, as the hives with the many varieties of *Apis mellifica* were displayed with all the modern appliances in the production of honey and wax. Some of the fertilizers of fossil and animal origin were of some degree of interest and of great importance. The exhibits of food stuffs were displayed in many instances in a striking manner.

The seed displays were divided between the horticultural and agricultural buildings. In the latter the field seeds were supposed to be shown to the greater or less exclusion of the garden seeds. The display of a firm of Paris (Vilmorin-Andrieux et Cie), in the French Section, was in the nature of a well-ordered botanical museum. On the walls were hung panels of wheat, specimen charts showing the sugar yield of beets and the starch yield of potatoes, and illustrations of their farms. They had 14 glass cases with models or casts of representative types of vegetables and strawberries. With the exception of a small collection of photographs in the alcoves of the Experimental Stations Exhibit, here seemed to be the only attempt to show anything of the results of hybridization. The name of Vilmorin has long been connected with experi

ments on the crossing of wheats and some of the graphic results were shown in small sheaves mounted upon tastefully framed green felt. Here were exhibited, also, models of representative average and normal forms of vegetables. The prime value of these models with their excellent arrangement was that it afforded the student a means of fixing the conventional standard or type and illustrating the chief lines of development and variation as arising therefrom. Two of the specimen charts were unique. One comprised six glass tubes about an inch in diameter and five feet long, containing proportionate amounts of "sugar in the juice," and refined sugar in the leading sugar beets. A similar chart displayed the starch yield from the varieties of potatoes. Altogether the exhibit was just such a one as a teacher of economic botany ought to possess in his museum and use in his teachings.

The Japanese garden was considered the unique feature, and has been acknowledged as a good example of Japanese art. It was 22 x 141 feet in extent and comprised 2,000 distinct plants. It was intended to represent such a garden as is to be seen adjacent to a dwelling house. Here were the hillocks, the cascades, the stone lamps, the sheet of water and the summer houses hidden in the clump of trees. Upon either side of the central walk were a miscellaneous collection of plants, so thickly planted as to nearly hide the earth. This walk passed over an arched bridge, which was peculiar in its construction. In the rear were blue and green sprays of *Juniperus littoralis* projecting over the water, while in front were large and small *Azaleas*, ferns and red-berried *Adrisias*. Among some of the interesting plants from Japan was a *Thuja orientalis*, about 3 feet high and 8 inches thick at the base. It was reported to be 100 years old, but its growth was so curtailed and dwarfed that it appeared as a very small shrub. In order to produce this result, the limbs of the trees are tied with ligatures, and at the same time they are placed in such positions that they will grow into the most fantastic shapes imaginable. The result is we have some trees reduced in size and presenting almost as hideous an appearance, compared to the original, as would a human being, whose limbs and body were dwarfed, tortured and twisted out of all shape. A number of the genera were thus represented. One Cypress, reputed to be 300 years old, perished with the cold of the previous winter. Some of the ancient crooked Maples were but a foot high,

in some of which every leaf had been carefully trained and others bore several varieties on the same top. A Pine tree was exhibited with gnarled branches and massive roots. In some of the Pines the needles were held in place to produce a fine cushiony effect that is so highly prized.

The Azaleas exhibited were of much interest. The most striking ones were large and free-growing bushes of *Azalea indica*, which earlier bore single dull red and pink flowers. One variety in particular, called Mitsusomekuruma, attracted considerable attention on account of its very small greenish-white flowers. There were exhibited also several varieties of the Ghent type. Here were two exceedingly curious forms reduced to five separate and long strap-shaped divisions. In one instance of the mollis type, the petals were red and spotted and the stamens were wanting. Another of the Indica type possessed dull pink or red petals and long red filaments entirely barren of anthers, giving the flower a strange spidery look.

Proceeding to the viticultural displays, we saw a most decorative sight, although there was but little genuine horticulture in it. In considering the grape interests, it would be well to divide the subject into two parts, as the Italians and some others have done: viticulture or grape growing and viniculture or wine making. Viticulture was shown by illustrations of the vine and its varieties in natural and artificial ways by cuttings, engravings and photographs. Methods of planting, staking and training the vine were to be observed, as well as the methods of and appliances for cultivating, harvesting, curing, packing and shipping the grapes. On the other hand, viniculture was demonstrated by the methods employed in expressing the juice of the grape; of fermenting, storing, racking and bottling, and finally shipping the wine.

The Deutsche Wein Ausstellung contained a larger variety of hands and number of exhibitors than that of any other wine exhibition in the Exposition. The German Wine Building was built in the form of a cloister cellar. The interior space being occupied with tables and stands of wine in bottles, being the combined exhibition of 289 growers and dealers of the German empire. The arrangement was simple, but the chief attraction lay beyond, upon the eastern and southern walls. Upon these sides, in the form of panorama, some of the most striking of the wine regions of

Germany were depicted. One looked as from a porch upon a landscape of remarkable picturesqueness, and the effect was greatly heightened by the plantations of grape vines in the foreground. These grape vines were the actual plants brought from the neighborhoods represented upon canvas and set in the earth as they customarily grow. Of course the vines themselves were not living, but were, however, dextrously clothed with artificial leaves and fruits, so that they almost perfectly represented the growing and bearing vine. As each of the panoramas represented a distinct wine district, so the wines in each of the foregrounds, showed the exact method of training employed in those districts, and the artificial fruits and leaves represented the varieties grown there. There were many panoramas in the Exposition, and there were none more perfect, nor probably more interesting (unless it was that in the Electrical Building) than these of the German Wine Building.

California's exhibit occupied nearly one-fourth of the ground floor space of this department. It was certainly with a feeling of pride that we viewed the efforts and progress of this comparatively young industry in the United States. One of the most notable pavilions was erected by four companies of wine producers. It was constructed of a section of a giant sequoia, which was 30 feet in diameter at the base and 290 feet high. Growing up from the base of the tree were grape vines with an abundance of ripe fruit hanging from the vines. In the interior were the exhibits of the four prominent houses. The exhibit of the vineyard of the late Senator Stanford showed, in a perspective view, the natural size of a section of the cellars of the vineyard which have a storage capacity of 5,000,000 gallons. This vineyard is probably the largest in the world, containing 3,840 acres, and producing annually 16,000 tons of grapes. Besides the exhibits of 25 smaller firms, the State Board of Viticulture had an instructive exhibit of photographs, engravings, etc., showing methods of cultivation of vine, etc.

The Japanese had a small exhibit. One sample of wine called "Seijyunbudosyn" was labelled with the following: "This wine can be recommended as nothing equals it under the sun." The Italians were represented by 130 firms displaying 560 brands of wine. The oldest vintage of record being that of 1812. The Russian Imperial Appanages exhibited a model of one of the principal wine cellars of an estate in the Caucasus with a capacity of about

432,000 gallons. There were some interesting exhibits by a number of exhibitors of woods, herbarium and seed specimens with photographs of the grapes and in some cases a display of the grapes themselves. *Vitis Lincecumii*, Buckley and its hybrids, seemed to attract some attention as being a source of fine quality of grape.

Among the fruits, those of the Citrus genus constituted one of the greatest attractions of the Fair. The largest single exhibit consisted of a column 35 feet high covered with nearly 14,000 oranges and some lemons. Lemon growing, while a comparatively recent industry in America, is looked upon as a paying product by the Californian people. The most remarkable, as well as the most handsome lemon in the exhibit was the "Bonnie Bræ," shown in the display of San Diego. It was long and smooth and possessed a short tip, a thin skin and was seedless. The fruit of Florida is earlier than that of California, but seems to keep better.

The lawns about the Horticultural Building were well provided and represented by some of the products of the leading botanical gardens of the world. The original design of having them bloom in their season was wondrously carried out. During May the Azaleas excited the admiration of the spectators, as their flames of color eclipsed that of all other plants flowering at that time. In early June 10,000 rhododendrons were the chief attraction. They are probably the most showy plant and carry with them an air of massiveness and stability which makes them beautiful. During June and July some 50,000 roses, including over 2,000 varieties, were most conspicuous and again "carried the day" and days. Was not this wonderfully suggestive? The roses of the world were here flowering at one and the same time and saying, peace, my peace, our peace we give unto each other. Later came the cannas with their fiery plumes and then followed the chrysanthemums and cosmos, the much prized and fashionable flowers of early spring. Besides these many other flowers were in bloom.

In the Manufactures and Liberal Arts Building were a number of botanical exhibits. Of particular interest were the colored models and charts exhibited by Germany and Japan. The petrified wood specimens from the forests of Arizona were indeed large and beautiful. Ice coolers, fountains, mantles, table tops and many ornaments were made therefrom. We were much interested in the ornamental application of the products of the Cactaceæ. It has

recently been found that the cacti growing at different altitudes vary widely as to their general structure; that those, for instance, growing in high altitudes possess a finer grain than the same specimens growing in the valleys. The wood of the former being more compact and not so porous has been found to be admirably adapted to the manufacture of a variety of ornamental articles. For manner of treatment of wood, etc., see *Scientific American*.

The exhibit of New South Wales was large and instructive. The Technological Museum, under the direction of J. H. Maiden having arranged every exhibit with full descriptions and applications. In this manner were displayed the economic plants, the substances used as food chiefly by the Aborigines, gums, resins and kinos from indigenous plants, tan barks, a miscellaneous collection of barks of economic value, indigenous fibres, galls and specimens of Australian economic entomology.

There was also a case of fibres handsomely mounted, 20 fine illustrations, 10 x 12 inches, very faithfully colored, from a forthcoming work on North American fleshy fungi, by Farlow, and a set of the published writings of Dr. Gray.

In the department of pharmacognosy the Pharmacy Department of the University of Michigan, was the only institution that endeavored to show to the world the work she was doing. I was much impressed with her display of herbarium specimens of plants in connection with commercial samples of the various parts employed in medicine. In a similar manner were displayed many of our prominent plant drugs, as rheum, kola, mate, guarana, tea, coffee, guaiac, cubebs, nux vomica, ignatia, etc., with their chemical constituents. A capital "kindergarten" idea for a student's museum.

Coming to the State Buildings, we find that many of them were not erected for exhibition purposes, but simply a kind of a club house for the use of both men and women. Some few, however, were exceedingly energetic, and their displays were not only interesting but instructive. Illinois, being in a sense, the host of the Exposition, had by far the most portentous structure. It was constructed almost entirely of the products of Illinois. The agricultural exhibit is very large. Upon one of the walls was a most ingenious work of art. It consisted of a typical farm scene, with houses, animals, fields, crops, workmen, etc., made from the products of the State. The whole gives the idea of an oil painting, so per-

fectly had the blending of colors from the natural grains and grasses been made. Upon one side of the frame was a heavy drapery, giving the effect of silk, it also being made of different grasses.

The exhibition relating to botany was probably the most complete exhibit illustrating the teaching of botany to be found at the Exposition. There was to be found a working desk equipped for an undergraduate student and another for an advanced investigator. Also a series of microscopes formerly used in contrast with those now used. Also sets of permanent mounts, reagents and stains employed, apparatus for photomicrography with photomicrographic enlargements, a very full bacteriological outfit with living cultures, an herbarium, etc. The Experiment Station exhibited a long case showing the diseases of cultivated plants and a collection of seeds of wild plants. Outside of the University exhibit there was a pavilion constructed of all the different woods grown in the State. Inside were samples illustrating the varied uses to which the various woods are put. There was another pavilion constructed of the products of the corn. The very uprights were grown in a corn-field, the roof being a thatch of stalks. All the decorations are typical of corn; the silky tassels served for frieze and dado, while the corn in the ear was arranged according to combinations of colors into many fantastic designs.

The State of Washington made a creditable exhibit. In front of the building was a mast, being a straight piece of fir,  $3\frac{1}{2}$  feet in diameter at the base and 215 feet high. The south and north wings each rested upon one piece of timber,  $3 \times 3\frac{1}{2}$  feet and 125 feet long. Each of these pieces was cut from a yellow fir tree 7 feet 11 inches in diameter and 340 feet high. There was a life-size full length of Washington, which had a frame made entirely of small pieces of wood, being inlaid with 77 different kinds of wood found in the State. Besides an interesting agricultural exhibit, there was one of the best herbaria to be found in the Exposition, in that the collector had given considerable information upon the labels regarding the occurrence of the species exhibited.

To the systematic botanist, the herbarium specimens, illustrative of the flora of Minnesota, Colorado, Montana, Missouri, Kentucky, Wisconsin, etc., were of considerable interest. In the construction of their buildings and in their displays the Western States, more particularly the younger States, realized that this was their oppor-

tunity of making known to the world their individual natural resources. They endeavored to and succeeded well in many instances in so arranging their products that it would strike the heart of the home seekers of limited means and the pocket-book of the capitalist seeking fields for the investment of his superabundance. Before closing this part of the description of the Exposition, reference should be made to the excellent collection of Cacti in the Territorial (Arizona, Oklahoma and New Mexico) Building. Here was a *Cereus giganteus* or "Sahura," as it is called, some 15 feet high, possessing a cristate top some 4 feet broad. Coming to that of Ceylon, we learn that her "Courts" were constructed entirely of native wood. Here was the principal exhibit of her tea, and much valuable information could be obtained from the publication of Ceylon and from the attendants. In the Merck Building were 36 wax models of medicinal plants. A number of specimens of opium, with scarificators and knives employed in obtaining the gum. Even in "Midway Plaisance" were some things of botanical interest to be found. Here the groves of orange and lemon trees, the Samoan houses and the Javanese village.

In conclusion, we referred to the momentary inspiration upon seeing that magnificent collection of buildings at the Columbian Exposition as being akin to that when beholding a young man upon his commencement day—surrounded by the rainbow of promise. This Exposition which we have seen was really but the repetition of a commencement day's experience. We long before anticipated a supreme pleasure as we thought of going from one exhibit to another, collecting data and securing information from every available source of the world upon botanical matters. In this we had a similar experience and disappointment to J. C. Arthur, of Purdue University, who wrote (*Bot. Gaz.*, Sept., 1893) that "there is considerable material through the Exposition of interest to botanists, but it is so widely separated and in the main so difficult to find, that it is likely to be largely missed by those who would receive the most benefit from the display." Also, "very few of the exhibits are accompanied by adequate information, sometimes they are entirely unlabelled, and as a rule the attendants, if they can be found, can add little if anything." This was to be expected, perhaps, in that the Exposition was a general exhibition. The managers certainly of the botanical part evidently did not appre-



ciate the details nor impress others with the possibilities that was here presented for a most remarkable and unprecedented educational exhibit of scientific methods and results. Here, as in so many other cases, the evil was increased by the perversion of the public taste, which causes work to be admired not in proportion to their fitness for their purposes or the skill evinced in attaining that fitness, but in proportion to their size and cost.

The last quarter of this century has witnessed a most remarkable development of specialization of labor. With the death of Mr. Darwin, we might say, was the extinguishment of the last scientific light that was able to illuminate equally well any and all departments of science. And as for the affairs of the world at large, it has been many centuries since we have had the men of whom it might be said "they have mastered all the knowledge of this day." And so in this discussion of the botany of the World's Fair, while we criticise, for to discuss was to criticise, we do not belittle the efforts of these gentlemen, for under the circumstances we do not feel possibly that we ought to have expected of them more than we do of a student upon his commencement day.

We hope that this is the last of the great general World's Fairs. They may be very interesting and of some profit (like the displays in our large stores during the holiday season) to the average mind, but they do not receive the support or the attention of the highest intellects in the contribution of their best work. And this best work in every department where skill is demanded will at the same time do the average person infinitely more good (just as a college education) than the showy and often tastily executed exhibits of a general nature, attended with simply one's own interpretation are largely intended as a means of commercial advertising. It is not my purpose at this meeting to expand upon this subject, but suffice it to say that we believe there should be in the future expositions having more a *specific character*. In the exposition of a scientific nature there should be a council composed of the most renowned and most capable scientific men who should be given sufficient time and who should have the same means at their disposal as this Exposition Committee for securing the contributions and support of the best institutions, societies and individuals of the world. Furthermore these exhibitions should be periodic and yet in a certain sense made as permanent as possible, so that additions and corrections

should be made (similar to the Committee of the U. S. P.) We are aware of many objections that may be raised, but these in time, after reflection, might, too, vanish like the stagnant pools and marshes in the suburbs of Chicago upon which the White City was built.

By way of further suggestion let us see what a World's Botanical Exposition might contain. One building might be devoted to the interests of morphological and systematic botany. Here could be displayed the models, charts and methods illustrating the study of morphology. Also the different methods of collecting, drying, preserving and classifying plants. Laboratories might be equipped and work shown with information thereupon given. A similar exhibit might be made in the building devoted to anatomical and physiological botany. In the building devoted to medical botany, an exhibition (as interesting as that in the Manufactures and Liberal Arts Building might be made), consisting of panoramas and illustrations of the cultivation, collection, preparation, with specimens, etc., of our important and interesting vegetable drugs. There would be other buildings illustrating horticulture, arborculture, viticulture, viniculture, agriculture, geographical and fossil botany, as well as the other industrial, ornamental and economical sides of botany.

It must be apparent that an exposition of this kind, botanically, would be, if properly managed, of a highly instructive and most interesting character to the world. The name of some one or of some event of world-wide importance would be necessary to arouse the interest in such an Exposition. Might not the name of Linnæus do this? Is it too much to hope that the next World's Exposition might be a botanical exhibition and called the World's Linnæan Exposition, to be held beginning May 23, 2007, in honor of the third centennial anniversary of the birth of Linnæus?

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## THE UNITED STATES PHARMACOPŒIA OF 1890.

BY GEORGE M. BERINGER, A.M., PH.G.

[Continued from p. 24.]

The formula for Trituration of Elaterin should have been omitted as the general formula for triturations is sufficient and more exact in the directions.

The *official* troches as a class are sadly neglected by the medical profession, and from a pharmaceutical standpoint they are badly in

need of a more thorough revision than they have obtained in this edition. But one actual dismissal has been made, that of Troches of Magnesia. The substitution of Troches of Santonin for Troches of Santoninate of Sodium was but a correction of this at once acknowledged error of the Pharmacopœia of 1880. We are of the opinion that Troches of Chalk and Troches of Ipecac have become obsolete and should be omitted, and as the preparation of peppermint and ginger lozenges appears to be left to the confectioner, these likewise could be spared from the official list. We are disappointed in not finding, as additions to the class, some of the frequently used troches, such as those of benzoic acid, cocaine, guaiac and its compounds and kino.

The *compressed* lozenge, although almost universally used, is not officially recognized. It could have been adopted in place of the *mass* lozenge for most of those in the official list. As a class the official troches are not in harmony with that marked spirit of progress that characterizes the volume generally. The most displeasing feature is the absence of any uniformity in the size of the finished products. They vary from .42 Gm. in Troches of Cubeb to 1.56 in Troches of Potassium Chlorate. The latter are unnecessarily large, the former too small. Between these extremes we find all sizes. They could readily have been classed under not more than two sizes: 1 Gm. and .7 Gm. or .75 Gm.

With the exception of Troches of Santonin, Troches of Ammonium Chloride is the only one exhibiting any improvement. The popular muriate of ammonium and Licorice lozenge has been introduced, but the quantity of ammonium chloride has been reduced to .1 Gm. in each instead of about .15 Gm., as generally made.

The official ointments exhibit but few changes of note. Ointment would have been improved by substituting *benzoinated* lard. Ointment of Carbolic Acid and Chrysarobin Ointment are both reduced to five per cent. instead of ten per cent. Of the three astringent ointments formerly official, the Ointment of Gallic Acid has been dismissed and the Ointment of Tannic Acid and the Nutgall Ointment have been both increased to 20 per cent., just double the strength of those official in the Pharmacopœia of 1880.

The formula for Ointment of Rose Water now given yields a rather odd amount of product 985 to 990 Gm. With the substitution of stronger rose water for rose water in this preparation, it has

been deemed advisable to reduce the amount. If 200 cc. had been directed in place of 190 cc, the product would have been about one kilogramme. The addition of borax materially improves the appearance of this ointment. The directions for the addition of the rose water are that the entire amount is to be added to the waxes and oil previously melted and poured into a mortar, "*without stirring*" and then to stir rapidly and continuously until the mixture becomes uniformly soft and creamy." The addition of 20 per cent. of water to the melted fats must necessarily cause congealing of the wax and separation in masses, which would be nigh impossible to beat to a smooth mass. The rose water should be directed to be *warmed* to the temperature of the fusing of the waxes before being added.

The directions given under Iodine Ointment and Iodoform Ointment that they should be freshly made when required might likewise have been applied to such ointments as those of tannic acid, potassium iodide and the mercuric oxides.

The addition of castor oil in Ointment of Red Mercuric Oxide serves well both as an aid in triturating the oxide and in preserving the ointment from oxidation.

A mixture of yellow wax and lard replaces suet in Tar Ointment. A mixture of wax and lard is less easily absorbed than suet and as the stimulating effect resulting from this absorption is desired we would prefer the old formula.

Sulphur Ointment is now directed to be prepared with washed sulphur instead of sublimed sulphur. The small amount of acid present in the latter from oxidation has heretofore been looked upon rather as desirable in this ointment.

The Pharmacopœia of 1880 directed, that in Veratrine Ointment the veratrine should be rubbed up with alcohol before incorporating with the benzoinated lard. It was found that this always resulted in the production of a resinous mass which it was almost impossible to evenly disseminate. The Pharmacopœia of 1890 directed six per cent. of olive oil in place of the alcohol. Both of these are unnecessary additions and in summer time the latter especially would render the ointment too soft. The veratrine should be directed to be rubbed up with about one-tenth of the lard to a smooth paste and this then incorporated with the balance.

The directions for Ointment of Zinc Oxide are to sift the zinc

oxide through a No. 20 sieve upon melted benzoinated lard; a number 40 sieve would be better.

The required alcoholic strength of both white wine and red wine is changed to from 10 to 14 per cent. in place of 10 to 12 per cent. and the method of determining the percentage of alcohol present incorrectly stated in 1880 is now correctly given. Stronger white wine is dismissed and where it was formerly directed in preparing the official wines, white wine, with the addition of 15 per cent. by volume of alcohol, is now ordered. In addition to this the number of the official wines has been decreased by three other dismissals, namely, Aromatic Wine, Wine of Aloes and Wine of Rhubarb.

In the formula for Wine of Antimony 1015 cc. of liquids is directed to yield 1,000 cc. of product. The quantity of white wine directed is 800 cc. instead of a sufficient quantity to make 1,000 cc.

Wine of Ipecac has been increased in strength to 10 per cent. by volume of the fluid extract instead of 7 per cent. The formula, however, fails to direct that the filter should be washed with sufficient white wine to make the product measure 1,000 cc.

Nineteen pages are required for the very complete list of reagents and instructions for preparing the same.

Twenty-seven pages are devoted to volumetric solutions and methods of analysis. We regret that this feature of the book has been marred by a statement made exactly 12 times in the 27 pages "that the figures given may be rounded off when a delicate balance and exact weights are not at hand." This is the more remarkable, as in the introductory note to this subject it is insisted that all volumetric solutions should be made and used at temperatures not deviating materially from the normal temperature, 15° C., and that all measuring vessels employed should agree among themselves in accuracy of graduation, thus avoiding the introduction of errors.

What chemist can, with any satisfaction, make volumetric estimations, using an inaccurate balance and weights?

In a volume whose chemical requirements are so exacting, such slovenly methods should not be condoned. Especially is this to be condemned in the preparation of such volumetric solutions as those of oxalic acid and iodine used to standardize other solutions.

Two pages are devoted to each of the following subjects, gasometric estimations, alkaloidal assay by immiscible solvents and determination of optical rotation of organic substances.

Eight pages are required for a list of chemicals and formulas.

It will be thus seen that 60 pages, one-tenth of the entire volume, are devoted to purely chemical instruction in addition to the many pages already occupied in the tests appended to the official products in the preceding pages. The increase of 115 pages in the present edition, amounting to more than 20 per cent. in the size of the volume, is largely due to this source. This may well serve to illustrate the present tendency of pharmaceutical training toward a more thorough education in chemistry. But it must not be forgotten that if the same privilege be extended to pharmacognosy, pharmacology, botany in its various relations to organic materia medica and other allied sciences that has been assumed by chemistry, the Pharmacopœia would soon become a commentary upon itself. A volume so cumbersome as to be unsuited to its purpose and use.

The Pharmacopœia should not be converted into a text-book on any science. It is with regret that we observe that the present tendency is to forget entirely its legitimate character. The Pharmacopœia is essentially a law book, a volume of statutes. As such, it should content itself with stating accurately the characters and requirements of the official products. Any deviation from this rule is a digression from its true scope. The official volume of the statutes enacted by a legislative body is unaccompanied by explanations and judicial opinions on the application of the laws.

It is hoped that, in future revisions, that the plan adopted will be to leave the methods of testing and of proving the purity of the official chemicals to a special volume compiled if necessary by authorities recognized by the pharmacopœial committee. A volume which shall be to the United States Pharmacopœia what Pribram and Welden "*Prüfung Arzneistoffe*" is to the new German Pharmacopœia.

Thirty-seven pages are utilized for the various tables. Those for alcohol, the acids and alkalis and for equivalents of weights and measures being especially noticeable for completeness. Forty-two pages are devoted to the very thorough index, which is one of the most commendable features of the book.

Viewed as a complete work the volume is remarkable for its advanced position; for the great progress which it indicates in the coming pharmacist. Its progressiveness and superiority from a

purely scientific standpoint is admitted. The committee evidently had in mind a lofty ideal for their Pharmacopœia. The book is at least a decade in advance of the scientific attainments of the average American pharmacist and is likely to give the impression to our foreign professional brethren that he is the possessor of knowledge and standing, alas, too often lacking. We imagine that we hear many of the class who are more concerned over the commercial aspect than the professional side of their calling, repeat the words of the horse to his groom in Æsop's fable: "Groom me less and feed me more."

I firmly believe that this is a grand step and that it will mark a distinct epoch in American pharmacy; that it will stimulate hosts of pharmacists to renewed efforts to maintain their educational and professional standing, and that it will compel many to a more thorough education in order to stand on the same plane to which this volume will elevate the progressive pharmacist. It is a matter of profound regret that in a volume of such magnificent intent there should be so much to criticise adversely.

In concluding this review the writer wishes to explain that it was undertaken in response to the request of the late editor of the American Journal of Pharmacy, Professor John M. Maisch, for a criticism to be published in parts commencing with the October number of the journal.

In discharging this task, I have conceived it to be my duty as well as to the best interests of pharmacy to unhesitatingly express my views. It has been the aim to avoid all personalities, and if any one has been offended it has been unintentional. The writer has no axe to grind and is personally acquainted with but few of the committee, nor has he any knowledge as to which members of the committee the various parts of the volume can be attributed. I have naturally assumed the position expressed by Mr. Hosea Biglow's candidate:

"There's nothin' thet my natur so shuns  
 Ez bein' mum or underhand;  
 I'm a straight-spoken kind o' creetur  
 Thet blurts right out wut's in his head,  
 An ef I've one pecooler feetur,  
 It is a nose thet wunt be led."

Hardly had the introductory lines of this review appeared before the writer was criticised as a pessimist, and his review as being

hastily written. In opposition to some of the views expressed very flattering reviews were quoted. I have no intention of replying to my critical friend who so evidently has misconstrued my position, nor is any defence needed. But I would assure him that it is much easier to flatter than to conscientiously criticise; to swim with the current than to stem the tide. But the latter may be the position of duty, and a review to be of any value must be the expression of independent thought, and devoid of flattery.

I am aware that it has become fashionable for reviewers not to look much beyond the preface, and this is so well known that shrewd authors now so word their prefaces as to purposely give the flattering critic material for his adulation. The true friend is not the flatterer.

I would also assure him that whatever progress is made by pharmacy, and introduced in the next Pharmacopœial revision will be the result of criticism and not flattery.

I would finally assure him that the writer would assume a position not second to any one in desiring a true advance and a scientific elevation of pharmacy.

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## GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

*Vanillin* according to an investigation of Professors Jorissen and Hairs is present in cloves, and can be isolated by extracting cloves with ether, agitating the ethereal solution with a solution of acid sodium sulphite, separating the latter, decomposing the sulphite with a mineral acid and agitating with ether; the ethereal solution leaves a white crystalline residue, having all of the properties of vanillin.—Südd., Apoth. Ztg., 1893, 591.

*Cocaine phenylate*.—Three formulas have been proposed for this substance to which Dr. v. Oefele again calls attention. (1) The preparation proposed by Viau was a mixture of cocaine hydrochlorate and phenol; phenol being more soluble in solutions of cocaine hydrochlorate than in water, suggested the above preparation. (2) Oefele proposed the fusion of molecular proportions of cocaine and phenol, or about three parts of cocaine and one part phenol; this preparation differs from that of (1) by being almost insoluble in water. (3) Poinot introduces under the same title a mixture of one



part phenol, two parts cocaine, forty parts vaselin oil, and twenty parts of arachis oil, which are fused together and put upon the market in tubes.—Dr. v. Oefele, Pharm. Centralhalle, 1893, 706.

*Sesame oil.*—The color test for this oil with sugar and hydrochloric acid which has been considered a characteristic test has, during the past few years, also been obtained with some brands of olive oil originating in Southern Italy and Northern Africa as well as with some samples of arachis oil. Villavecchia and Fabris, in a study of sesame oil, find the principle giving the color to be a dense, uncrystallizable, non-nitrogenous oil, which, in alcoholic solution, will give red color with sugar and hydrochloric acid. In this test there is produced furfural and this has repeatedly been proven to be the substance which is actively concerned in the production of color reactions as the sugar in all such tests can be replaced by furfural solutions; the tests obtained by the use of the latter are generally more delicate. A specific test for sesame oil, originating with Villavecchia and Fabris, is based upon the use of an alcoholic furfural solution (2 gm. in 100 cc.); of this furfural solution 0.1 cc. is placed in a test tube, 10 cc. of the oil under examination and 10 cc. hydrochloric acid, sp. gr. 1.19 added, agitated for half a minute and allowed to stand; in the presence of *one per cent.* sesame oil in the suspected oil the aqueous solution separates with a red color, while in the absence of sesame oil only a yellowish color is produced. A modification of this test consists in added to 0.1 cc. furfural solution, 10 cc. of the oil, 1 cc. hydrochloric acid, agitating, adding 10 cc. chloroform to dissolve the oil and noting the color of the aqueous layer; less than one per cent. sesame oil is sufficient to give a fine red color; in the absence of sesame oil no color is to be seen, or in the cases of those *olive oils giving the color with the original test a greenish color* is produced.—G. Morpurgo, Pharm. Post, 1893, 537.

*Carbon disulphide* is employed in chemical analysis by F. Musset as a means of separating small quantities of precipitates, indifferent to hydrogen sulphide, from aqueous suspension; the precipitates, becoming suspended in the carbon disulphide if a small quantity of this be agitated with the aqueous mixture, the aqueous solution becomes perfectly clear so that it can be decanted; after the evaporation of the carbon disulphide from a capsule the precipitate is obtained in a condition for further examination. The advantage

of the method is that the small precipitate is not collected upon a filter, and can be more easily examined. In the decomposition of ammonium sulphide solutions of the sulphides of arsenic, antimony, tin, etc., by hydrochloric acid, the agitation of the acid solution with carbon disulphide removes the precipitated sulphur by dissolving it so that it is possible to say at once if the sulphur was accompanied by any of the above-mentioned sulphides as the latter are not soluble in the solvent; in the presence of these sulphides the carbon disulphide is opaque due to the suspended sulphides, while the aqueous solution is perfectly clear.—Pharm. Centralhalle, 1893, 737.

*Peru balsam.*—A systematic method of examining this drug for the adulterants, alcohol, resin, turpentine, Canada balsam, copaiba, rosin oil, gurjun balsam, castor oil, other fixed oils, storax, tolu balsam and benzoin is offered by E. Hirschsohn. 3 parts of the balsam are thoroughly agitated with 15 parts petroleum-ether, allowed to stand until the petroleum-ether solution is perfectly clear, when it is decanted and used for the following tests: A portion is agitated with half its volume of water; a transient turbidity of the petroleum-ether and the iodoform test with the aqueous layer (addition of KOH and iodine solution after warming) indicate the presence of *alcohol*. Another portion is agitated with an equal volume of cupric acetate solution (1 gm. in one liter water): A, *an intense bluish-green color*, imparted to the petroleum-ether indicates the presence of resin, turpentine, Canada balsam, copaiba, rosin oil; B, *a colorless or pale green* colored petroleum-ether may indicate storax, fixed oils, tolu balsam, benzoin and gurjun balsam.

A. I. The petroleum-ether solution mixed with half a volume of brom-chloroform (one part bromine dissolved in twenty parts chloroform) gives a red-violet color; the balsam, 2 gm. heated upon a water-bath for one-half hour with 1 gm. freshly prepared calcium hydrate forms a solid mass; one volume balsam and four volumes 80 per cent. acetic acid give a turbid mixture, separating oily drops after several hours' standing. These several tests indicate *copaiba*.

A. II. Brom-chloroform gives no coloration.

(a) The balsam with  $\text{Ca(OH)}_2$  forms a soft mass, with acetic acid a turbid solution from which oil drops separate after a short time; the residue of the petroleum-ether solution is soluble in 90 per cent. alcohol—*rosin oil*.

(b) The balsam with  $\text{Ca(OH)}_2$  forms a solid mass, with acetic acid

a turbid solution which, after several hours' standing, does not deposit oil globules; the balsam with 4 volumes absolute ether, after filtration gives a turbid mixture upon the addition of 5-10 volumes of 90 per cent. alcohol; the petroleum ether residue is not perfectly soluble in 90 per cent. alcohol—*Canada balsam*.

(c) The balsam with  $\text{Ca}(\text{OH})_2$  forms a solid mass, with acetic acid only a slightly turbid mixture, the ethereal solution remains clear upon the addition of alcohol (90 per cent.) and the petroleum-ether residue is perfectly soluble in 90 per cent. alcohol—*resin turpentine*.

B. I. Brom-chloroform with the petroleum-ether solution produces a blue-violet mixture, the petroleum-ether residue with hydrochloric acid sp. gr. 1.19, hydrobromic acid sp. gr. 1.4 or phosphoric acid sp. gr. 1.7, is colored red; the balsam with  $\text{Ca}(\text{OH})_2$  produces a soft mass, with acetic acid, a turbid solution depositing oil drops after several hours—*gurjun balsam*.

B. II. Brom-chloroform produces no coloration.

(a) The balsam with  $\text{Ca}(\text{OH})_2$  produces a soft mass, with acetic acid, a turbid solution speedily depositing oily drops. The petroleum-ether residue, if soluble in 90 per cent. alcohol = *castor oil*, if insoluble with the separation of oil = *other fixed oils*.

(b) The balsam with  $\text{Ca}(\text{OH})_2$  a solid mass, with acetic acid an opalescent or only faintly turbid solution.

(aa) The petroleum-ether solution with cupric acetate is distinctly greenish in color, after decanting and mixing it with hydrogen sulphide solution the mixture becomes brownish; the petroleum-ether residue with nitric acid sp. gr. 1.38, is colored a fine bluish-green—*storax*.

(bb) The petroleum-ether solution with cupric acetate is indistinctly greenish in color and with  $\text{H}_2\text{S}$  changes to a pale brown; nitric acid does not color the petroleum-ether residue = *tolu balsam*.

(cc) The petroleum-ether solution with cupric acetate is colorless and is not altered by  $\text{H}_2\text{S}$ . The petroleum-ether residue is not colored by nitric acid = *benzoin*.

The following tests, based upon the above, are serviceable in the examination of Peru balsam for purity :

(1) The balsam mixed with half its weight of calcium hydrate, and heated upon a water-bath for half an hour, should *not* give a solid mass; this test by itself is not considered reliable since the addition

of a small quantity alcohol produces a solid mass, while the presence of castor oil (without alcohol) produces a soft mass not differing from that obtainable with a pure balsam.

(2) One volume balsam with four volumes 80 per cent. acetic acid should produce an opalescent or only faintly turbid solution from which no oily drops separates after two hours' standing.

(3) The petroleum-ether solution of the balsam should have a pale yellow color and with a dilute cupric acetate solution (1:1000) should not be colored green or bluish green.

(4) The petroleum-ether solution upon the evaporation leaves a residue which should not be colored by hydrochloric acid sp. gr. 1.19.—Pharm. Ztschr. f. Russl., 1893, 369, 385 and 401.

*Cupric oxide* used by E. Hirschsohn in the detection of rosin in oil of cassia, was found to be unreliable as a reagent because of the different conditions followed in its preparation; some specimens would impart to a five per cent. petroleum-ether solution of resin, upon agitation, an immediate intense bluish-green color, other specimens gave no color or only a faint-green after contact for twelve hours. Studying the conditions for the preparation of a reliable cupric oxide, it was found that if one part crystallized copper sulphate, 0.6 part potassium hydrate and 18 parts water be boiled for two hours, an oxide of the greatest activity is obtained; the oxide should be dried at low temperatures and should not be ignited since this operation will notably decrease the sensitiveness of the oxide.—Pharm. Ztschr. f. Russl., 1893, 705.

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## ABSTRACTS FROM THE FRENCH JOURNALS.

TRANSLATED FOR THE AMERICAN JOURNAL OF PHARMACY.

*To detect iodine* combined in the state of an iodide or an iodate, G. Denigès makes use of the ingenious process of Suilliot and Raynaud for the preparation of iodoform, which consists of adding an alkaline hypochlorite to an iodide in the presence of acetone and claims that by using these same reagents very small quantities of iodine can be detected either directly or by means of the microscope. In the case of an iodide, the solution, if it is not a base of potassa or of soda, is precipitated by neutral sodium carbonate and filtered; to several cc. of the filtered liquid is added one drop of solution of caustic soda or sufficient to render it slightly alkaline;

then 5 or 6 drops of a 10 per cent. aqueous solution of acetone and followed by an alkaline hypochlorite, such as the commercial solution of chlorinated potassa, added drop by drop. If an iodide is présent, even in very slight proportion, a whitish cloudiness is observed which soon concentrates to clear yellow granulations of iodoform. If the result is to be confirmed microscopically, a portion of the deposit is placed on a glass slide together with one or two drops of the liquid or else of water, covered with a thin glass and carefully heated to near the boiling point of the liquid. Upon cooling, the microscope will reveal the hexagonal prisms and derivative forms of iodoform. In the case of iodate, this is first reduced to the state of an iodide, by the addition of a drop of sodium bisulphite at 40° B., before applying the process.—*Four. de Pharm. et de Chim.*, December, 1893, p. 499.

*Diiodoform* has been reported upon by Maquenne and Taine to the November meeting of the Société de Thérapeutique. They regard it as a definite carbon iodide, having the formula  $C_2I_4$  and being almost entirely destitute of odor, so long as it is protected from the influence of light. It is entirely insoluble in water and but slightly soluble in alcohol or ether; the best solvents are chloroform, sulphide of carbon, benzine and especially hot toluol, from which it crystallizes in beautiful yellow prismatic needles, differing entirely from the hexagonal prisms of iodoform. In the pure state it fuses at 192°, emitting abundant vapors; by brisk heating it is decomposed into carbon and iodine. Diiodoform is obtained by treating acetylene periodide by iodine in excess. It is also formed by the action of aqueous potassa and iodine on barium carbide, held in suspension in benzine or chloroform.—*Four. de Pharm. et de Chim.*, December, 1893, p. 525.

*A process for the estimation of iodine* in syrup of iodide of iron has been formulated by Gioachino Griggi, based upon the following reaction between potassium chlorate and protoiodide of iron:



8 gm. of the syrup are placed into a test tube, and 2 cc. of a 5 per cent. solution of potassium chlorate in distilled water added. After heating the mixture until it assumes an ocherous red color, and allowing it to cool, 5 cc. of pure chloroform are added, the tube is closed, cautiously agitated and then allowed to rest. The iodine

set at liberty, is taken up by the layer of chloroform, and imparts to it a beautiful amethyst-violet color. The chloroformic solution is decanted, added to sufficient distilled water, and the iodine is estimated by normal solution of sodium hyposulphite.—*Boll. chim., pharm.*, through *L'Union pharm.*, October, 1893, p. 445.

*Commercial examples of yeast* were examined by M. Maljean, the results of which are shown by the following table :

Number of samples.	Water.	Ash.	Phosphoric acid.	Starch.	Sodium chloride.	Per cent. of acidity of fresh yeast.	Remarks.
1, . . . . .	60'75	4'75	1'10	12	trace	0'40	These yeasts of nine different manufacturers produced bread whose weight varied from 250 to 350 gm. The acidity was determined with fresh yeast in presence of alcohols (Balland's process).
2, . . . . .	64'65	5'70	1'30	8	—	0'38	
3, . . . . .	59'	3'80	0'85	8	—	0'38	
4, . . . . .	58'25	3'80	0'90	8	—	0'50	
5 { Pure yeast, }	73'25	7'75	1'85	0	—	0'69	
6, . . . . .	72'25	7'50	1'90	0	—	0'74	
7, . . . . .	62'	5'40	1'30	9	—	0'42	
8, . . . . .	61'70	5'40	1'29	9	—	0'41	
9, . . . . .	60'80	5'50	1'30	10	—	0'39	

After drying, pure yeasts have an agreeable odor, recalling that of hot bread ; they form thin scales, adhering to the vessel in which they were placed, and acquire a slightly dark brown color. Yeasts mixed with starch have, upon drying, a strong disagreeable odor ; they form small masses more or less agglomerated and spotted with white, which is in proportion to the starchy matter they contain.—*Four. de Pharm. et de Chim.*, Oct., 1893, p. 353.

*A study of the physiological action of digitalis species* was undertaken by Goldenberg (thesis, Yourieff, 1893), as a result of which he concludes that all species of digitalis exert the same action on the heart of a frog as the infusion of *digitalis purpurea* ; but differ considerably in the energy of their action. While *digitalis eriostachys* and *digitalis glandulosa* are only slightly active, and the action of *digitalis Fontanesii* is extremely feeble, *digitalis nervosa* is 1·5 times, and *digitalis ferruginea* even 10 times more active than *digitalis purpurea*. The various parts of the plants contain the active principles in varying quantities, the seeds being richest in active con-

stituents; then follow the leaves, the membranes of the seeds and lastly the stems. In the latter a substance predominates (digital-resin or toxiresin), whose action commences by exciting the nerve-centres, and ends by paralyzing the muscles.—*Vratch*; through *Nouv. remèdes*, November, 1893, p. 509.

*The action of sodium phosphate in presence of alkaloids* has been studied by M. Christiaens, who concludes that in order to avoid the precipitation of alkaloids in this combination, it is necessary to neutralize by the addition of phosphoric acid to the preparation, by which the precipitates are completely redissolved. The author states the general rule, that all salts, whose reaction with litmus is *alkaline*, precipitate alkaloids from their salts.—*L'Union pharm.*, November, 1893, p. 521.

*In preparing camphorated salol* in the crystalline state, M. Barnouvin found that a mixture of 3 p. salol to 2 of camphor showed the first formation of crystals only after several days, and that as the proportion of camphor is diminished the crystallization is more rapid, a mixture of 9 gm. salol and 1 gm. camphor crystallizing after a quarter of an hour. The process of preparation consists of fusing the two pulverized substances in a porcelain mortar at a gentle heat, and allowing them to crystallize; it is advisable to place the crystals on filter-paper from time to time; the crystals thus obtained are dry, white and brilliant, possessing the combined odor of salol and camphor. In pulverizing them a powder is produced which is soft to the touch, less unctuous and less white than salol in powder.—*Jour. de Pharm. et de Chim.*, 1893, p. 363.

*To distinguish catechu from gambier* or pale catechu, M. Gibson has recourse to a microscopical examination for the anatomical structures of the two drugs, gambier being prepared from the young twigs of *Uncaria gambir* bearing the leaves and flowers, while catechu is obtained from the central portion of the trunk of *Acacia catechu*. He dissolves the drug either in an alkali or in 30 per cent. acetic acid, and then examines the insoluble residue.—*Jour. de con-nais. méd.*; *Répertoire de Pharm.*, Dec, 1893, p. 533.

*To employ sodium phosphate as a purgative*, Constantin Paul has devised the following formula, which was reported to the November meeting of the *Société de Thérapeutique*: Distilled water, 200 gm.; sodium phosphate, 25 gm.; simple syrup, 60 gm.; and tincture of lemon, 20 drops. In order to gasify the preparation, 2 gm. each of

citric acid and sodium bicarbonate may be added.—*Four. de Pharm. et de Chim.*, December, 1893, p. 527.

*Malacine* is a salicylic derivative of phenacetine, has the form of small pale yellow crystals, insoluble in water, but soluble in hot alcohol; the mineral acids, even in feeble solution, decompose it into salicylic aldehyde and phenacetine. Dr. A. Jaquet, who studied its therapeutic action, considers it an antirheumatic which is usually well borne and produces no untoward effects.—*Semaine Médicale*; *Nouv. remèdes*, October, 1893, p. 465.

*Galloparatoluide* was obtained by M. Cazeneuve in the form of small crystalline plates, fusing at  $211^{\circ}$ , slightly soluble in cold water, but very soluble in boiling water, alcohol and ether. Hydrochloric acid decomposes it into gallic acid and paratoluidine; protected from the air, the caustic alkalies do not attack it even at the boiling point, but in contact with air they gradually transform it by oxidation.—*Compt. rend. de l'Académie des Sciences*, Nov., 1893.

*Administration of castor oil*.—M. Patein advises the administration of castor oil in an emulsion of the following formula: Castor oil, 30 gm.; syrup of almond, 30 gm.; syrup of acacia, 30 gm.; peppermint, 10 gm.; distilled water, 50 gm. To the mixture of the two syrups, the oil is added, then the two distilled waters, mixing intimately after each addition.—*Petit Monit. de la Pharm.*, Oct., 1893, p. 1353.

## THE LETTER OF THE LAW—SEQUEL OF A CELEBRATED CASE.<sup>1</sup>

Rarely is such a measure of interest accorded a legal process by the pharmaceutical and medical world as was aroused some two and a half years ago by the famous *Nux Vomica* suits in the Atlantic Court of Common Pleas, New Jersey. A brief review of those proceedings and of the curious solution which time has recently effected in the legal complications, will not be devoid of profit.

The plaintiff in both these cases was George W. McGuire, State Dairy Commissioner for New Jersey, and criminal action was brought by him against the two defendants,<sup>2</sup> on the charge that

<sup>1</sup> Reprinted from the Bulletin of Pharmacy, January, 1894.

<sup>2</sup> The defendants were Harry B. Leeds, and Albert D. Cuskaden, druggists, and the expenses of the defence were borne by Parke, Davis & Co.



each had sold a quantity of tincture of nux vomica which upon examination was found to contain less than two per cent. of dry extractive. The basis of the prosecution was an existing New Jersey statute, which enacted that any preparation shall be deemed to be adulterated if (when sold under or by a name recognized in the U. S. Pharmacopœia) it "differs from the standard of strength, quality, or purity laid down therein." And 2 per cent. extractive, as stated, was the standard of the U. S. P. at that time.

The evidence introduced developed the fact that the tincture had been prepared from normal liquid nux vomica, Parke, Davis & Co.; the plaintiff's witness testified that it contained 0.712 per cent. of dry extractive; and upon this the prosecution rested its charge of adulteration within the meaning of the statute, no attempt being made to establish the therapeutic inferiority of the disputed preparation, or any deficiency in the needful content of the all-important alkaloids.

Seldom has such an array of learned talent or such a wealth of distinguished evidence been brought forward in defence of any cause involving a pharmaceutical question, as was now adduced by the respective defendants in sustaining their position. Professors Remington, Hare, Rusby, Ryan, Marshall, Dr. Eccles, and the lamented Professor Bedford, all went upon the stand and declared with one voice that the active constituents of nux vomica are its two alkaloids, strychnine and brucine, alone; that the quantity of dry extractive forms no standard of strength, quality, or purity, and may, indeed be completely inert—without medicinal property or physiological action; that tinctures of nux vomica made, as was the one in question, from the normal liquid, are far more reliable than the tinctures on the market produced in exact accordance with the U. S. P. formula, since the former are of uniform alkaloidal strength, and the latter subject to extreme variations of medicinal potency; that the U. S. P. standard could be easily evaded by the addition of sufficient glucose to any inferior tincture; and finally, that the Pharmacopœia of 1880 really offered no means of determining the "strength, quality, or purity" of the tincture to which the name standard could with any propriety be applied, hence was virtually devoid of such standard.

All for naught. Here the gods themselves would have contended in vain. Conceding the entire probity of the defendants, and the

full medicinal value of their tinctures prepared from the normal liquid of *nux vomica*, Judge Reed, nevertheless, decided in the first case that such tinctures were adulterations within the meaning of the New Jersey statute, since the requirement of 2 per cent. dry extractive was not fulfilled! In the second case, some misgivings must have begun to assail the judicial intellect, since the case still hangs suspended in the limbo of the undecided.

But if the Judge showed an undue tenacity in clinging to an obsolete standard, and a disposition to apply the narrow letter of the law, our Pharmacopœia Commission have taken a very different view of the question. In the revised edition (1890) we are happy to observe a radical change in the requirement made of tincture *nux vomica*: it is no longer 2 per cent. of extractive, but rather 0.3 per cent. of total alkaloids—the identical alkaloidal content which the manufacturers of the normal liquid had long adopted as their own standard for the tincture. The new Pharmacopœia became a part of the New Jersey law on Jan. 1, 1894, thus depriving the cases of all legal basis.

While we may now smile at the emphatic way in which time has rejected the decision of the New Jersey Court, it is obvious that its very absurdity from a medical and pharmacal point of view was not without a compensating benefit in promoting the adoption of a rational standard for this and a few other important preparations in the new Pharmacopœia. Inasmuch as five of the witnesses for the defendants were likewise members of the Revision Committee, the agitation imparted to the question of standardization by the *nux vomica* cases were unquestionably an active agent in the pharmacopœial changes thus far introduced—changes which, it is to be hoped, will be multiplied until every potent official remedy shall be provided with a standard which will guarantee a uniform medicinal action.

The introducers of normal liquids may well feel content with the handsome vindication which their enterprise has received at the hands of the Pharmacopœia Commission, and with the high compliment embodied in the recent adoption of their well known standard for the official tincture.

## MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, January 16, 1894.

On motion of Professor Trimble, Dr. C. B. Lowe was called to the chair. There were no donations to the library; a number of samples of sugar of milk, from the American Lactose Company, whose works are situated at Plainfield, N. J., were shown. The samples are numbered from one to eight, evidently being the whey in different stages of preparation: the first concentrations, the first purification and decolorization; crystallization to the finest crystals and powder. Two samples of trade packages in tin cans were also among the exhibit. A paper upon the manufacture by Mr. W. B. Thompson appears on page 78, of this number.

Dr. H. M. Alexander, of Marietta, Pa., read a most instructive and interesting paper upon Vaccine Virus, and the methods of obtaining it from the animal as now practised in the best regulated establishments devoted to that industry.

It is too late to discuss the question of the propriety of vaccination; that safeguard has become too well-established and acknowledged among educated professionals and laymen to admit of a doubt. The objections to humanized virus and that from filthy or diseased cattle are recognized and avoided by the precautions adopted by the systematic and carefully arranged vaccine establishments.

The source of true cow-pox has been definitely traced to Beaugency, in France, and it was from this the late Dr. Henry A. Martin obtained the virus which was propagated from heifer to heifer in this country in 1870.

At first a great deal of virus was obtained from cattle utterly unfit for such uses, and kept in stables reeking with filth; it is to avoid such sources of infection proper virus farms were arranged, and every caution that care and good judgment could suggest have been taken to obtain reliable material for vaccination.

The location of a vaccine farm is of the first importance as, without the advantages of fresh air and perfect cleanliness this can hardly be hoped for, and then only in open country where every sanitary condition is easily maintained. The buildings should be built especially for the purpose and light and ventilation must be carefully attended to, and an abundance of pure filtered water must be had at all times.

The selection of animals is of great importance, young heifers between one and two years old are preferable, and rented from farmers who have raised them for dairy purposes; this enables the proprietor of a vaccine farm to trace the strain of the stock and learn of any defects that might exist in the animals. When the animals are found to be suitable subjects they are stabled, groomed carefully, and fed on bran mashes, until fit for operating. The animals are then fastened to a cushioned table and turned over easily in a position in which they rest comfortably, and the inner portion of the flanks back and above the udder are shaven and then inoculated with virus taken from a former case. After they have been treated they are kept in stalls specially arranged, and watched for seven days and nights. When the operation has proven successful the crusts are removed with the handle of a scalpel, the vesicles cleansed by sponging and all impurities removed.

When the lymph is exuding, the points, previously sterilized, are secured in

clamps capable of holding fifty of them, and are coated twice with the lymph from two animals by means of a camel's-hair pencil, so that the operator does not touch them at all. When the points have been thus twice coated they are carefully inspected, packed in glass containers and labelled. Dampness with a temperature above 100° F. is sure to injure the virus; good vaccine points can generally be relied on for sixty or ninety days; and it has been sent to Palestine, Hindoostan and China, where it was used successfully.

The method of vaccination is a matter of importance and upon its proper performance the result will almost always determine successfully. The best plan is to scrape off the scarf-skin and scratch the abraded surface in two directions when the serum is just apparent. The point barely moistened on one side is applied, and the pasty virus is applied to the absorbents and the operation is completed.

The whole subject so far as it is needful for intelligent persons to understand the methods and care necessary to deal in good articles of the kind, has been fully explained and is most gladly submitted to your consideration.

As Mr. Crawford was unable to be present to-day to continue this interesting paper upon the forestry of the Columbian Exposition, Mr. H. C. Barker read a paper, *Pycnanthemum lanceolatum*, or mountain mint. See p. 65, of present number of the journal.

A couple of boxes each containing about a quarter of a pound of Keifun, or Japanese Calomel, was exhibited by Professor Trimble, who received it from Chicago, through the efforts of Mr. Joseph Crawford, where it was on exhibition among the Japanese manufactures of the Columbian Exposition. Its appearance is different from the Calomel as obtained by the processes adopted in the more Western countries, those of Europe and America. It is in fine scales and much lighter than Calomel obtained by the officinal processes of Continental or American Pharmacopœias. It is prepared in a very simple manner from mercury salt and an earth found in the neighborhood of the Village of Isawa, Japan. It has been made for about 300 years by members of the family of the present maker, whose works employ about ten persons, and the output is about 15,000 pounds annually. The maker is Heirjiro Kokubu. It sells for \$1.40 per pound, silver.

A vote of thanks was given to Dr. Alexander for the interesting and instructive lecture, and also to Mr. Barker for the paper read, both of which were referred to the committee on publication.

There being no further business, a motion to adjourn was put and carried.

T. S. WIEGAND, *Registrar*.

## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*Belladonna, A Study of its History, Action and Uses.* Edited by F. B. Kilmer. New York: Johnson & Johnson. 1894.

A short monograph, containing contributions, translations and abstracts from the following; Henry Kraemer, Ph.G., Chas. Rice, Ph.D., Prof. E. S. Bastin, J. M. Maisch, Ph.M., Prof. C. V. Riley, Prof. J. Bernard Smith, Prof. J. P. Remington, Ph.M., Dr. E. E. Eccles, Prof. J. U. Lloyd, Prof. H. C. Wood, Dr. A. R. L. Dohme, Prof. J. B. Smith and others. It is a small pamphlet of 72 pages, profusely illustrated, treating of the history, botany, pharmacognosy, pharmacy,

pharmacology and therapeutics of belladonna. The last forty pages of the pamphlet are taken up by a treatise on the local action of belladonna when applied as a plaster.

*A Dictionary of Medical Science*, containing a full explanation of the various subjects and terms of anatomy, physiology, medical chemistry, pharmacy, pharmacology, therapeutics, medicine, hygiene, dietetics, pathology, surgery, bacteriology, ophthalmology, otology, laryngology, dermatology, gynecology, etc. By Robley Dunglison, M.D., LL.D., late Professor of Institutes of Medicine in Jefferson Medical College of Philadelphia. Edited by Richard J. Dunglison, A.M., M.D. Philadelphia: Lea Brothers & Co. 1893.

This work, of which we have the twenty-first edition before us, hardly needs any words of recommendation from our hands, as the value of the same is well indicated by the number of editions it has gone through. According to the publishers' announcement forty-four thousand new words and phrases have been added, and although everything obsolete has been omitted, the work still contains over 100 pages more than its predecessor. The pages have been enlarged, and although everything obsolete has been omitted, the work still contains 1,181 pages. Among the additions we find the pronunciation of the words indicated, and also the derivation thoroughly given, which alone makes the dictionary of great value to the student. Besides this the explanatory definitions have been enlarged, from which much valuable information may be obtained. The work is gotten up in excellent shape, and shows thorough revision and improvement throughout.

*Contributions from the Botanical Laboratory of the University of Pennsylvania.* No. 2. Pp. 202 and 4 plates.

The second number of this serial is devoted to one contribution on "Maize: A Botanical and Economic Study." By John W. Harshberger, Ph.D.

This interesting monograph traces, through various channels, the origin of the cultivation of maize to have been with the Maya tribes of Mexico, at a period not far from that of the Christian era. The author clearly disproves the theory that it was of Asiatic origin. A chapter on the chemistry of the plant, and considerable bibliography on the subject, add to the value and interest of the work. The whole contribution is worthy of imitation by other American investigators.

*Anatomischer Atlas der Pharmacognosie und Nahrungsmittelkunde.* Von Dr. A. Tschirch und Dr. O. Oesterle, Leipzig. T. O. Heigel, Nachfolger. 1893.

Anatomical Atlas of Pharmacognosy and of Foods and their Adulterations. The first part before us contains angelica root, German chamomile, tea, capsicum and mustard. Each drug is fully described as regards its anatomical structure, and to make the work more precise, each description is accompanied by a plate showing the different sections and elements of structure. The descriptions are clear and the plates well executed. The work is of such a character that it will become a standard work of reference and can well be placed alongside of the Berg'sche Atlas.

*The Student's Dictionary of Medicine and the Allied Sciences.* Comprising the pronunciation, derivation and full explanation of medical terms, together with much collateral descriptive matter, numerous tables, etc. By Alexander Duane, M.D., assistant surgeon to the New York Ophthalmic and Aural Insti-

tute ; Reviser of Medical Terms for Webster's International Dictionary. Philadelphia : Lea Bros. & Co. 1893.

This dictionary, although not as voluminous as Dunglison's Dictionary, is still as full as a student would desire. The tables contain much interesting and useful information. Especially is that the case with the table on Bacteria and Fungi, which is arranged in five columns, the name, origin, morphological characters, temperatures at which it flourishes in degrees Centigrade, and properties. The article takes up thirty-four pages, most of it being taken up by the table. Other tables are those on the arteries, canals and foramina, exanthemata, joints, muscle (21 pages), nerves (6 pages), poisons and antidotes and rales and other adventitious respiratory sounds. The explanatory descriptions are short and clear, and on the whole the work ranks well with the Dunglison's Dictionary, published by the same house. The paper, typography and binding are excellent. The work consists of 650 pages.

The following reports of pharmaceutical associations have been received :

*American Pharmaceutical Association.* Forty-first annual meeting ; Chicago, August 14 to 21, 1893.

This the first part of the proceedings containing the minutes, reports, papers and discussions of the meeting.

*Minnesota.*—Ninth annual meeting ; Hotel St. Louis, Lake Minnetonka ; June 13 and 14, 1893.

*New York State.*—Fifteenth annual meeting ; Lakewood, N. Y., June 27, 28 and 29, 1893 ; containing as a frontispiece a well-executed portrait of Prof. P. W. Bedford.

The following pamphlets have been received :

*A Pathology and Treatment of Nervous Catarrh.* By Seth Scott Bishop, M.D., of Chicago.

Reprint from the Journal of the American Medical Association.

*Report on Nasal Surgery.* By M. T. Coomes, A.M., M.D., of Louisville, Ky. Reprinted from American Practitioner and News.

*Formalin, Diabetin, Rubidium Iodide, Creosote Carbonate.* Schering.

Four pamphlets giving description and uses of the various medicaments.

*Central Experimental Farm, Ottawa, Canada. Bulletin, No. 19.* Containing Grasses : their uses and composition. Published by direction of the Hon. A. R. Angers, Minister of Agriculture.

## OBITUARY.

*Dr. Frank P. Sher*, Ph.G., Class 1875, died at his late residence, 1002 Snyder Avenue, Philadelphia, Pa., November 14, 1893, aged 38 years and 9 months, of acute pneumonia. He learned the drug business with J. W. Dallam & Co., at Second and Callowhill Streets, and graduated from the Philadelphia College of Pharmacy in 1875. Afterwards he attended the Jefferson Medical College, and graduated in medicine. For some years he conducted a drug-store, at 1813 South Sixth Street, in connection with the practice of medicine. About four years ago he relinquished the drug business and removed to 1002 Snyder Avenue, where he devoted his entire time to the practice of medicine. He was well known in the lower section of the city, and had an extensive practice, and was highly esteemed by all who knew him. He was connected with several political, social and fraternal organizations.

# THE AMERICAN JOURNAL OF PHARMACY

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MARCH, 1894.

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## CRUDE CARBOLIC ACID.

BY H. W. JAYNE, PH.D.

The composition and methods of preparation of the crude carbolic acids of commerce appear to be so little understood by pharmacists generally that it seems as if a few remarks about them, from one who has practical knowledge of their manufacture, might be of interest to those present.

Many text-books state that crude carbolic acid is prepared by repeatedly distilling a portion of the coal tar, until a fraction is obtained boiling between  $170-190^{\circ}$  C., which is then extracted with a strong solution of caustic soda. This method is not used at present in large works either here or abroad.

While it is possible to obtain a fraction rich in acids by repeated distillation, yet the total yield is less, for a certain amount is lost in each distillation, either by volatilization, or by being destroyed by contact with the heated sides of the still.

In this country, as a rule, the tar is distilled in two fractions. The first consisting of all the lighter portions is called the light oil, and is collected until a sample of the oil that runs from the still sinks in water. The whole fraction when mixed has a gravity of from 0.94 to 0.99. The second fraction consisting of about 20 per cent. of the tar, constitutes the creosote—or heavy oil—commonly called dead oil. The residue left in the still is soft pitch. In some cases the first portions of the dead oil are collected separately, in order to obtain a fraction as rich in acids as possible, which is then known

as carbolic oil. The light oil which boils between 90 and 250° C. contains from 4 to 10 per cent. of acids, and therefore nearly all of the carbolic acid, or true phenol, boiling at 182°.

The dead oil contains from 10 to 20 per cent. of acid, the carbolic oil, if made, sometimes shows as high as 30 per cent. These oils contain also a certain amount of carbolic acid, but the proportion is much less than in the light oil.

In Europe, where most of the crystal carbolic acid is made, the fractions are collected differently. The first portion running from the still containing most of the benzol and toluol is called crude naphtha or first runnings. The second portion, which is collected as long as the distillate is lighter than water, is called light oil or second runnings, and is very rich in phenol. The third fraction constitutes the carbolic oil. The portion to be extracted is agitated with a weak solution of caustic soda, about 10 per cent. is the right strength. If a strong solution is used, many impurities contained in the oils, especially naphthaline, are also dissolved and contaminate the finished acid. After agitation the mixture on standing separates into two layers—the upper consisting of the extracted oil—the lower the solution of carbolate of soda. This latter is drawn off, and on acidifying with either sulphuric or hydrochloric acid, the tar acids are liberated, and float on the surface as an oily layer, holding more or less water in solution, depending on the nature of the acid present. For convenience in consideration, we will arbitrarily divide the crude acids into two classes.

- (1) Crude acids for the manufacture of crystal carbolic acid.
- (2) Crude acids for disinfecting purposes.

Acids of the first class are not a regular commercial article in the United States, as there is only one firm manufacturing crystal carbolic acid, but in Europe, especially in England, they are prepared on a very large scale. As their value depends on the amount of crystal acid they contain, they are sold by test. Crystal carbolic acid being the first of the series of phenols has the lowest boiling point. Therefore, the boiling point of a crude acid is to a great extent an indication of its value.

In England, an arbitrary method has been devised by Lowe, which gives an approximate idea of the value of these acids. A sample (say 100 cc.), is distilled in a retort or flask. At first water passes over, then an oily liquid. When 10 cc of this latter have been col-



lected, the receiver is changed, and the next 62½ cc. collected apart. The residue in the retort is cresylic and higher acids. The 62½ cc. obtained as a second fraction is cooled, and the solidifying point ascertained by a thermometer placed in the liquid. These crude carbolic acids are sold as 50°, 60° or 70° acids, meaning thereby that the second fraction of 62½ cc. crystallizes at 50°, 60° or 70° F. That containing the most crystal acid showing the highest melting point.

A good quality of 60° English crude carbolic acid distilled as follows :

	Per Cent.
To 180, . . . . .	17 (11 p. c. water)
" 185, . . . . .	21
" 190, . . . . .	71
" 195, . . . . .	88
" 200, . . . . .	93
" 205, . . . . .	95

The portion representing the 62½ cc. distilling between 184°¾ and 193°.

A very good grade of light oil must be used to obtain such an acid, if a higher fraction of the tar is extracted, the acid obtained shows a correspondingly higher boiling point.

The following acid was extracted from the first portions of the dead oil :

	Per Cent.
To 180, . . . . .	14 (11 p. c. water)
" 190, . . . . .	20
" 195, . . . . .	55
" 200, . . . . .	74
" 205, . . . . .	82
" 210, . . . . .	88
" 220, . . . . .	91
" 230, . . . . .	93

The 62½ cc. of this acid did not crystallize until cooled to 25° F. If insufficient soda is used, it would be possible to extract, even from an oil of this nature, a certain amount of acid rich in phenol. Phenol has a greater affinity for soda than its homologues, therefore, if one-half the soda necessary for complete extraction is used, the solution will contain a greater proportion of phenol than if the material was extracted completely.

This is clearly shown by the following experiment. A sample of

oil was treated with three equal portions of weak caustic soda solution, the last portion extracting the oil completely.

Each solution was neutralized with sulphuric acid, and the resulting acids distilled. In order to show their composition more clearly the result is calculated after deducting the water present.

Acid from :

	First Portion. Per Cent.	Second Portion. Per Cent.	Third Portion. Per Cent.
To 180, . . . . .	6	—	—
" 185, . . . . .	30	—	—
" 190, . . . . .	74	1	—
" 195, . . . . .	86	41	2
" 200, . . . . .	91	71	16
" 205, . . . . .	94	83	54
" 210, . . . . .	—	87	74
" 215, . . . . .	—	91	84
" 220, . . . . .	—	—	88
" 225, . . . . .	—	—	92

The first portion is equal to a 60° acid, and contains a large amount of phenol; the third portion, none at all. To prepare crystal acid from these crude materials, they are carefully rectified in large iron stills, the watery portions separated, and the fractions from (say) 180° to 190° cooled, the phenol crystallizes and is drained from the liquid portions. The crude crystals thus obtained are then carefully refined. As the crystal carbolic acid has a much higher value than the other acids, it is in the interest of the manufacturer to remove it as completely as possible. The remaining liquid acids are sold as "crude carbolic acid 100 per cent.," as they are entirely soluble in caustic soda solution, excepting traces of naphthaline and other impurities.

The lowest grades of crude acids known as 10, 15, 20 and 25 per cent., are simply unextracted portions of the heavy oil, containing this amount of tar acids. The higher grades, 50, 60 and 70 per cent., are prepared by adding 100 per cent. to the lower grades.

As the heavy oils used in mixing these acids contain a large number of bodies, these are of course present in the commercial acids. The most important of these are the pyridine bases and naphthaline. The former gives to certain acids a rank, disagreeable smell. The latter is generally present in large amounts, some oils consisting of more than half crude naphthaline. In cold weather this anphthaline is deposited, and as the liquid portions are drawn off, it

finally remains in the barrels as an oily mass, which will not again become liquid, thereby occasioning a serious loss to the purchasers. It does not appear to be generally understood that these acids consist largely of oil, for it is a common occurrence to find disinfecting acids in bottles, labelled with directions for mixing with water, when a test shows that it is entirely insoluble in water, and contains only a small percentage of acid.

Many methods of testing crude carbolic acids have been proposed, which apparently ignore the large per cent. of oil present.

An instance of this is the method recently proposed by Seiler, and which has been extensively copied by journals throughout the country.

His method is to weigh 100 grams of the sample in a large beaker, adding milk of lime (obtained by slaking 200 grams of lime) and diluting to one liter. The whole is placed on a water-bath and stirred for an hour, after which the same amount of water is again added, when cold it is filtered; washed with fresh water and filtered again. The acid is liberated by hydrochloric acid, salt being added to the solution to remove as far as possible the acid dissolved in the liquor. It is then separated and weighed. He sums up the result of his investigation by stating that an acid sold as 25-30 per cent. showed only 2 to 3 per cent.; a 40-60 per cent. acid gave 3 to 5 per cent.; a 50-80 per cent. and a 90-100 per cent., 80 per cent. From this he concludes that commercial acids contain considerably less than stated, and that the lower grades are worthless.

To one acquainted with the nature of crude carbolic acids, the defects of this method are at once apparent. The slaked lime on mixing with the acid forms an oily mass, from which it is nearly impossible to extract any acid. Lime is too weak a base to extract the last portions of acid from the oil, and the voluminous liquid, amounting with the wash waters to about three liters, dissolves a large percentage of the acid even when saturated with salt.

It will be noted that the crude acid said to contain the larger amounts, gave better figures than the low grades, which was to be expected, as there was about the same amount dissolved in the salt solution from that acid that should have given 25 cc. of acids, as from that which should give 100 cc.

As these crude acids are only for disinfecting purposes, and as cresylic and the higher acids are now recognized to have the same,

if not better, disinfecting properties than phenol, it does not seem necessary to determine any other point than the total per cent. of acid they contain. No simpler method can be devised than the well known one of shaking a certain quantity of the material in a graduated vessel, with weak caustic soda, and noting the decrease in volume. To verify the result the soda solution can be acidified and the tar acids measured. The amount liberated is always less than that indicated by the decrease of the volume of oil, owing to the solubility of the acid in the salt solution.

For this test I would recommend a 100 cc. burette, divided in tenths, and furnished with a glass stop-cock. It is filled to the 50 cc. mark with 10 per cent. of caustic soda solution; 25 or 50 cc. of the acid to be tested is then added, the burette closed with a cork and well shaken. On allowing to stand, the decrease in the volume of oil is readily measured; 50 cc. soda of the strength indicated is sufficient to saturate 12 cc. of 100 per cent. acid. If it is necessary to add more soda the already saturated solution can be readily drawn from the burette and another 50 cc. added.

Frequently the percentage of naphthaline in low grade acids is so great that it separates from the liquid as soon as the acids are removed; as this prevents an accurate reading, it is necessary to add 10 to 15 cc. of benzol to dissolve the deposit.

In some cases the acids are contaminated with tarry or resinous bodies, which dissolve in the caustic soda, rendering the solution so dark that it is impossible to see the line separating the two liquids. In this case it is advisable to distil another 25 cc. portion nearly to dryness in a small flask, considering the distillate as 25 cc., and repeating the test. The entire operation requires but a few minutes, and the results of many hundred trials show it to be accurate enough for general purposes.

A mixture of equal parts of heavy oil and cresylic acid was made, and tested by the above method. The contraction showed  $49\frac{1}{2}$  per cent. of acid present, the liberated phenols gave 49 per cent. The same mixture tested by Seiler's lime method, gave only 22 per cent. every precaution being taken to insure a good result.

Another mixture prepared with 25 per cent. of acid, gave  $24\frac{1}{2}$  per cent. by extraction, and 24 per cent. of phenols set free. The lime method gave but 6 per cent.

The Pharmacopœia requires that 50 volumes of a crude acid

mixed with 950 parts of water, should not leave undissolved more than five volumes or 10 per cent. It is difficult to understand for what reason such an arbitrary test is required. Fifty cc. of insoluble residue in 1,000 cc. of solution is difficult to measure with accuracy, particularly as the acid often adheres in fine globules to the sides of the measure. This may seem a small objection, yet it is very important when the acceptance or rejection of a large lot of acid depends on it.

A sample of excellent 60° crude carbolic acid was tested by the method of the Pharmacopœia, and answered its requirements, about four volumes remaining undissolved. Another portion of the same acid was then distilled to remove the small amount of tarry matter and about 11 per cent. of water present. This fine light-colored acid showed by the Pharmacopœia test fifteen volumes or 30 per cent. insoluble. In other words, an acid containing all the best portions of the first sample and having 15 per cent. more value as a disinfectant would not stand the test.

A sample of distilled cresylic acid, free from water, distilling to

	Per Cent.
190, . . . . .	12
195, . . . . .	70
200, . . . . .	88
205, . . . . .	97

gave 25 volumes or 50 per cent. insoluble. It was found necessary to add 75 per cent. of crystal carbolic acid (melting point, 35°) to 25 per cent. of the above cresylic acid, before a mixture could be obtained which would give a satisfactory result.

As the Pharmacopœia requires an acid for disinfecting purposes only, and not for preparing crystal acid, it is useless to require such a high per cent. of phenol, and it would be undoubtedly to the purchaser's interest to buy an acid free from water. If the idea is to prevent the use of the higher boiling phenols, which are very little soluble in water, the difficulty could be overcome by the following requirements:

It should not be soluble in less than 15 parts water at 15° C., and the aqueous solution should not have an alkaline reaction. It should dissolve in 10 per cent. caustic soda solution, leaving not over 5 per cent. insoluble. Should not show over 2 per cent. water, and 90 per cent. should distil under 225° C.

## EUPARIN. -

BY CHARLES C. MANGER.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.  
No. 130.

This compound, from *Eupatorium purpureum*, was described by Professor Henry Trimble, in the *American Journal of Pharmacy*, 1890, p. 73.

The history and method of preparation were then described. From the results obtained in the investigation at that time, the empirical formula ( $C_{12}H_{11}O_3$ ) was assigned it, but it was not possible to classify it with any of the known plant compounds. With a view of adding something to our knowledge concerning it, this work was undertaken on a liberal supply of the crude material furnished by Professor Lloyd, of Cincinnati, and by Mr. E. G. Eberhardt, of Indianapolis.

The substance supplied was purified by digesting an alcoholic solution of it with animal charcoal and subsequently recrystallizing.

By these treatments the euparin was obtained in acicular or prismatic crystals which melted constantly at  $116^{\circ}C$ .

That the purity of these might be further proven, the substance was submitted to ultimate analysis. The following was the average of the results of the several combustions which were made:

	Found Per Cent.	Calculated for ( $C_{12}H_{11}O_3$ ). Per Cent.
Carbon, . . . . .	70.80	70.94
Hydrogen, . . . . .	5.31	5.42
Oxygen, . . . . .	23.89	23.64

When carefully heated the crystals sublimed.

Euparin was found to be insoluble in water, sparingly soluble in petroleum-ether, readily soluble in ether, chloroform, benzol and acetone. When water was added to its solution in the last-named solvent the euparin appeared to be precipitated in direct proportion to the degree of dilution, although the very dilute solution still retained traces of the substance.

Ten per cent. aqueous solution of potassium hydrate dissolved the crystals, but dilution with water precipitated the substance, apparently unchanged.

Ferric chloride gave a grass green color with an alcoholic solution of euparin.

Hot concentrated sulphuric acid gave a black solution of the substance. Cold acid of the same strength gave a red colored solution, which appeared dark yellow in thin layers, and from which water precipitated a green plastic mass. The unfiltered mixture was shaken with ether in which the green mass was insoluble, and with which it was separated. The ether was allowed to evaporate spontaneously, and the residue and the plastic mass were treated with boiling alcohol, which dissolved nearly all the substance, and from which it was deposited upon cooling.

The green plastic mass and the residue left upon the evaporation of the ether were examined for sulphur by fusing with potassium hydrate and potassium nitrate, but after dissolving the products of the fusions in water and supersaturating the alkali with nitric acid, no precipitate was obtained in either case with barium chloride, indicating the absence of a sulphur derivative. After having been boiled with one per cent. sulphuric acid for six hours, euparin retained its original appearance and answered its usual reactions. The acid liquid, when filtered and made alkaline with sodium hydrate gave no indication of glucose when heated with Fehling's solution. In order to gain some idea of the constitution of euparin, the following substitution products were made.

#### CHLORINE SUBSTITUTION PRODUCT.

Purified chlorine was passed into a solution of 7 grams of the crystals in absolute ether.

Upon standing, the liquid deposited nothing, but upon spontaneous evaporation, a thick yellow liquid of unstable character was obtained.

This became hard and somewhat brittle, but showed no signs of crystallizing, when exposed to a temperature of  $-16.6^{\circ}$  C.

It was soluble in alcohol from which it separated when the solution was chilled to  $-15^{\circ}$  C. This solution gave a blood red color with ferric chloride.

The substitution product was somewhat darkened by treatment with potassium hydrate, and imparted a yellow color to that liquid, but upon acidification with nitric acid silver nitrate revealed but traces of chlorine.

Ammonium hydrate acquired a dark red color when brought into contact with the compound which it partly dissolved. When this

liquid was made acid with nitric acid and silver nitrate was added, a bulky precipitate of silver chloride was produced.

That part of the product which was insoluble in ammonium hydrate, had a grayish-black appearance. Estimation of the chlorine in the substitution product. A mixture of this substance and chlorine—free calcium carbonate was heated to redness for two hours. The tube and its cooled contents were treated with water and then with nitric acid in excess. The solution was filtered and the broken glass rinsed with water which was passed through the filter and added to the solution which was next completely precipitated with silver nitrate. The silver chloride was collected, washed thoroughly and dried at  $130^{\circ}$  C.

4.142 grams of the compound gave 6.443 grams of silver chloride. This amount of silver chloride contains 1.5905 grams of chlorine or 38.48 per cent. of the weight of the substitution product.

Assuming that chlorine replaces an equal number of hydrogen atoms in the molecule  $C_{12}H_{11}O_3$ , this would at least require the molecule  $C_{24}H_{22}O_6$  in which seven hydrogen atoms have been replaced, giving  $C_{24}H_{15}Cl_7O_6$ . This formula represents 38.31 per cent. of chlorine.

#### ACETYL DERIVATIVE.

Five grams of euparin were boiled with 5 grams of anhydrous sodium acetate and 10 cc. of acetic anhydride for two hours. When the resulting liquid was poured into water a heavy oily layer separated. This was washed with several successive portions of water and finally dried, over sulphuric acid, in a desiccator.

When cooled to  $-15^{\circ}$  C., the substance became a crystalline mass, but reassumed its original form when the refrigeration was discontinued, and, when heated in a paraffin bath to  $125^{\circ}$  C., it was decomposed.

When heated on platinum foil, the liquid gave off an acetous odor, burned with a luminous flame and left a minute residue of odium carbonate.

The sodium salts were separated by treating the material with later and shaking the mixture with ether, which dissolved the acetyl compounds and upon spontaneous evaporation left it in the fluid condition. When freed from sodium salts, the product became denser, but did not crystallize at a low temperature.



A second quantity of the substitution product was made in the same manner as employed for the first, but with the omission of the sodium acetate. The resulting compound had the general characters of the previous sample and became dark red—through the composition—when dried over calcium chloride.

On account of the unstable character of this substance, no definite knowledge of its composition was gained from the results of combustions and of estimations of acetyl which were made.

#### NITRO COMPOUND.

Euparin was treated with hot nitric acid (sp. gr. 1.40), the resulting dark red liquid diluted with water and the copious flocculent precipitate obtained was dissolved in potassium hydrate. The alkaline liquid was acidified with dilute sulphuric acid and shaken with the ether, to which it imparted a yellow color. Upon drawing off and evaporating the ether, yellow crystals mixed with some brownish substances were obtained.

These crystals fused and became black between  $121^{\circ}$  and  $123^{\circ}$  C.

They were soluble in water and the yellow color of the solution was intensified by alkalis.

The aqueous solution had an acid reaction and a bitter taste. It colored the skin yellow and dyed wool and silk the same color.

The following tests for picric acid were obtained with the water solution :

Normal lead acetate, no precipitate.

Basic lead acetate, yellowish precipitate.

Ammoniacal copper sulphate, dark green color, upon standing a precipitate was produced.

Ferric chloride, brownish-red precipitate.

Potassium cyanide, purplish-red color.

Quinine sulphate, yellow precipitate.

#### ACTION OF FUSED ALKALI.

Euparin was gradually added, with constant stirring, to potassium hydrate in the fused state. The liquid became brownish-red in color and emitted an apple like odor. The cold mass was dissolved in water, the solution acidified with dilute sulphuric acid and shaken with ether which removed the color, and upon separation and evaporation left a dark red-brown residue. This was dissolved in

absolute alcohol, but upon recovery of the solvent was left in the same condition as before. The residue was almost completely dissolved by water, which afforded a solution possessing a sweetish taste and a slight acid reaction.

The following tests showed this solution to contain phloroglucol. Fehling's solution, reduced.

Ferric chloride	}	dark violet color unchanged by heat.
and		
Sodium carbonate,	}	maroon colored precipitate.
Normal lead acetate,		
no precipitate.		
Basic lead acetate, slight yellow precipitate.		
Gelatine, no change.		
Potassium permanganate, decolorized.		
Ammoniacal silver nitrate, reduced.		
Calcium hydrate, flocculent precipitate.		

#### CONCLUSIONS.

Euparin appears to form no sulphur compound with concentrated sulphuric acid. With chlorine it forms a definite but quite unstable substitution product. With acetic anhydride a very unstable liquid compound is formed.

Concentrated nitric acid converts euparin into picric acid.

On fusion with potassium hydrate, euparin is converted chiefly into phloroglucol.

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## FAIR FORESTRY OUTSIDE OF THE UNITED STATES.

BY JOS. CRAWFORD, PH.G.

Our neighbors on the north were very kind, hence we will talk about them first combined under the general term Canada, and contained in one enclosure.

They were the following, namely: Prince Edward's Island, Nova Scotia, New Brunswick, Quebec, Ontario, Northwestern Territory and British Columbia, with special mention of exhibits of Quebec, N. W. Territory and Ontario.

These showed their vast timbers by sections of the trees, cross and longitudinal, plain and polished, as well as some very large-sized boards, among them *Arbutus* wood, which is not represented in the States.

Manitoba having such a good general collection, stood on her dignity and would not accept the small space allotted her, but erected a commodious building outside the Fair Grounds on Stony Island Avenue, opposite the California Building, and there displayed her products to not only her satisfaction, but all visitors also.

A warmer neighbor, Mexico, presented to our view, a very complete set of timber specimens, mostly of dark woods, but not well classified, and having lost our Spanish somewhere en route, we did not recover it until after sampling their genuine Zapote chewing gum, then these are what we saw and read: under the South Colonnade, a Mahogany Log, 43 feet long by 41 inches square (*Swietenia Mahogani*), Ebony (*Diospyros ebenum*), Bombax (*Acacia Acapulcensis*), Mulatto wood (*Xanthoxylon Clavi-Herculi*), Guaco (*Aristolochia grandiflora*), contrasting strongly to our small species of *Aristolochia*, Linoleum (*Amyris lignalœ*), Cedar (*Cedrela odorata*), for cigar boxes, Brazil wood (*Cæsalpina crista*), Campeachy wood (*Hæmatoxylon campeachium*), Dragon's blood (*Pterocarpus Draco*), many Magnolias, *Schinus molle*, known as Pepper Tree, and which was used so much this past season as a decorative shrub on the Fair Grounds, especially around California Building, Cypress (*Taxodium distichum*), Pitch Pine (*Pinus communis*) and many forms of Cactus wood. To represent their oaks, of which they have many species, they showed *Quercus Virens* or Live Oak, and claim it as the most durable as well as the strongest. The Balsamo (*Myroxylon Pareira*) is one of their hardest, and used principally for railroad sills. Zopilote, an Ash (*Fraxinus trilobata*) or Turkey Buzzard Tree, is a very common one; it has a smooth brownish bark, which annually peels off, depositing itself at the base of the trunk in large quantities and emits on fermentation the odor of musk. *Mora excelsa*, one of order *Mimosæ*, yields 75 per cent. tannin, according to their statement, and is found not only in the bark, but the wood itself. They call it Granadillo.

*Spondia canescens* furnishes a very hard wood, but as they say, its great peculiarity is to concrete its sap, in amber colored crystals as hard as flint, thereby completely inutilizing the implements of the workmen. Last that I shall mention from this country is the sweetest of all chictzapotl chicle (*Sapota achras*), which forms the most beautiful evergreen tree in the country.

Here we are now in Central America, but not in Forestry Hall,

as they have their own buildings. Guatemala and Honduras in one and Costa Rica in another. The former did not lack material, but their method of exhibition was bad and also suffered much by neglect. The same could be said of Costa Rica's crude drugs, but her woods occupied conspicuous space on ground floor. They were arranged in 2 pyramids about 15 feet diameter and same height composed of tree sections and slabs, varying from 2 to 6 or 8 feet in length.

Among them we noticed Zapotillo, Laurel, Quebracho, Guayacan, Roble, 10 or 15 varieties of Cedro or Cedar, Cocobola, Sangre draco, Palma, Zapote, Manzanillo and Algarroba.

Venezuela's woods on exhibition were reduced to the number of 15 or 20, and no information was attached nor could any be obtained elsewhere.

In the Liberal Arts Building was a fine display of the natural resources of Jamaica, and prominent among them was a large number of woods in slab form and condition, no attempts at classification and nothing could be learned of them, to the great regret of those having them in charge.

Hayti had a very clever collection in her own building, arranged in the form of a large pyramid in a corner of the building and containing large specimens in natural and polished condition of these tree bearing officinal drugs or those closely allied to them. *Xanthoxylon caribbean*, *Catalpa longisliqua*, *Bignonia arborea*, *Acacia arborea*, *Tecoma leucoxylon*, *Piper aduncum*, *Mimosa anjuscacti*, *Chiconea floribunda*, *Theobroma guozumi*, *Guaiacum officinale*, *Simaruba excelsa*, *Hæmatoxylon Campeachium*.

Trinidad, or as their genial Commissioner calls it, "The Land of the Humming Bird," showed fewer timbers but larger boards or slabs and finer colored woods than any other country. Also the only one exhibiting the Purpleheart or Amaranth, a species of *Copaifera*. This resembled very much the heart wood of our Red Cedar, but durable in color and had very small portion of white duramen.

These woods were all board size 1½ feet to 3 in diameter and 8 or 10 feet long, one-half natural, the other polished, and besides the Purpleheart were the Galba, resembling cigar box cedar, Locust, a dark red wood, Guelpha, creamy white, very close grain, resembling a maple, Tapana, reddish walnut color, and used for carriages,

Fustic, Logwood, Balata, Roble, Guava Pigeonwood, Spanish Ash and *Copaifera officinalis*.

British Guiana had a small collection of her timbers, and all highly polished.

Brazil's Forests were represented by some 441 specimens from the State of Amazon and among them, please to note Castanheira (Brazil nut) (*Bertholetia excelsa*), Copaiba, Cumara (*Dipterix odorata*) Divi Divi, Cedro, Audiropa, Saboneta (*Sapindus saponaria*), and Ucuhiba (*Myristica sebifera*). These are all useful timbers there, and few if any ever exported to this country.

Paraguay showed some 300 timbers, varying from 12 inches to 4 feet diameter, and most of them being polished slabs, from which the bark had been removed and usually of that dark color so common to that country, Brazil and Argentine.

Argentine Republic succeeded finely as a country in showing her woods, as nearly every State responded favorably to the call, about 22 altogether, also 85 or 90 individual exhibitors.

The interest manifested was entirely too great for their allotted space and about one-fourth only could be exhibited and remainder stowed away under platforms, tables, etc., and same inconveniences happened to their plants. They had 1,000 or 1,500 specimens of these and not space enough to place one in view. The timbers were of commercial slab size and mainly the dark varieties shown by private individuals, while the government showed the trees in lengths of 4 and 5 feet, with the bark remaining for one-third the length, while the remainder was half natural and half polished, so that the tree was presented in 3 conditions.

These principal ones were Algarroba for Walnut, Mistol, Roble, Cedrela for cigar boxes, Palma nigra, black palm for ornamental posts, Quebracho (*Aspidospermo Quebracho*) resembles our White Oak (*Quercus Alba*) both in bark and wood.

*Juglans Australis*, their only walnut, approaches our black very much in color and grain.

Quebracho Colorado, another useful one, and also a great tannin producer, nearly 24 per cent., and also as a substitute for *Aspidosperma*.

Another wood resembling our walnut is the Algarroba (*Prosopis juliflora* and *nigra*) and is actually exported as a substitute for it.

This belongs to order Leguminosæ, as does also *Cæsalpinia melanacarpa*, another walnut substitute.

Zapello (*Pisonia zapello*), Laurel (*Ocotea suaveolens*), Quillaya Tellowiana and *Eugenia pungeus* are other important woods, making excellent durable timber.

They took great pride also in their tanning materials, and among the prominent barks and fruits for that purpose were these :

*Acacia angice* and *abramontana*, *Psidium guava*, *Ocotea suaveolens*, or Laurel, *Nectandra posphyne*, Root of mistol, (*Zizyphus Mistol*) Fruit *Cæsalpinia Melanocarpa*, Barks of *Juglans australis* and *Aspidiosperma*, *Croton succirubra*, *Berberis ruscifolia* and *Eugenia Michaela*.

In striking contrast to their woods they showed the following, of which you may know something : Honey Locust (*Robinia Psued-acacia*), Alder (*Alnus ferruginea*) Maple Leaved Negundo (*Negundo Negundo*). Many of our common Beeches and the Weeping Willow (*Salix Babylonica*).

From Europe we had the excellent display of cork and cork tissue ; from Spain, also tans, dyes, licorice, collections of woods including a very complete one from Philippine Islands. Mahogany from Cuba and Porto Rico.

France not only finely illustrated what they were doing to perpetuate Forests by showing us their Reports of Directors and Inspectors of Forestry which were very complete, but showed us many blocks of wood 8 x 12 inches and 22 inches thick with bark removed and surface polished, some dye materials and valuable knobs for veneers, some of which were valued as high as \$1,000 ; also a good collection of seeds and cones. Adjoining France was Siam's exhibit, consisting of 20 or 30 pieces of wood, well polished but not named, a handsome council table of Teak wood attracted considerable attention ; in spite of printed warning "Hands off," hands were "on" entirely too often. The names of vandals have a wider reputation this Columbian year than any previous one.

Some cordage also claimed our attention as composed of the long rattan, they find it much more durable than manilla even for cables. Edible Bird's Nests proved an attraction if not a delicacy.

The series of Ratan Baskets were unique and very artistic ; they were made entirely by convicts, but the prices were most surprising.

The Javanese had similar work and much cheaper.

Germany had no exhibition of woods or so few as not to be noticeable, but showed these fine wood productions, Beer Casks, Barrels, Tubs and Vats, also Cork in its varieties.

The Forest Academy showed the scientific methods of Forest Culture as practised in that country.

Sweden showed Wood Pulp Industry and Cellulose derived from Spruce trees, but no attempt to represent timbers.

Russia's exhibit was characterized by crude and manufactured material from the Linden Bark Fibre (*Tilia Europea*), and comprised nearly everything, from shoes for the sole of the foot, to thatched house to abide in. Shoes, slippers, rough garments, kitchen utensils, and other household articles, matting, brooms, brushes, planking, thatching and many others, which we could not stop to consider, but the whole line was very interesting to every one.

They had also many fine sections of timbers, but no cosmopolitan classification, and we could decipher very little information concerning them.

The Administration of Crown lands gave a finely illustrated idea of timber and its culture, diseases of trees, medicinal plants and roots, gums and resins and Forest management, as also did the Forest Academy of St. Petersburg and the Russian Agriculture, Forestry and Mining Commission.

Japan conferred an honor upon us which I fear was little known, that of being the first country to receive a display of her woods outside of her own, or any attempt to represent them in a foreign land. I have reason to believe that Philadelphia museums will eventually receive the entire Forestry Collection, as their courtesy towards Philadelphia people was decidedly marked, and the least favor more than reciprocated, notably the Secretary of the Commission, Mr. Shikasa Suwa, who took almost a boyish delight in those people who did ask questions and was untiring in his efforts to please them.

The space allotted was entirely too small, and hence crowded inside and out, with scarcely space enough for an aisle.

There were two methods of showing woods, and in both cases were prepared timbers, bark having been removed. One style was a framed collection of the sections about 10 x 14 inches and about 20 or 25 to a frame, the other was by means of unpolished boards, 8 to 10 feet long, and the width of the tree.

Their attempts at labelling were very successful, and beside the technical name, they had the common English name as well as the

Japanese, also the general characters under which the tree existed and flourished, as well as its direct uses to man.

For their lacquer work the principal tree is the Paulownia (*P. Imperialis*), a tree which is adapting itself to our latitudes and proving a fine shade tree.

Another for same purpose is Zelkova Kaki, one of the elm family, and still another is a Horse Chestnut (*Æsculus turbinatus*) called by them "Tochi."

Their largest trees are the Cryptomerias, a class closely related to our Southern Cypress, often reaching wondrous heights, and are the admiration of all visitors to that Empire.

With that little relation of Cryptomeria to Cypress we are able to find some of our genera represented by species close to our own. For that resemblance to relationship we feel very much at home among them, for instance, *Taxus cuspidata*, or yem, *Thuya obtusa* or Arbor vitæ, *Æsculus turbinatus* or Horse Chestnut, *Tilia cordata*, or Linden, *Morus alba*, Mulberry, *Juglans Siboldii* and *Regia*, Walnuts, *Acer Japonicum* and *palmatum*, Maples, *Fraxinus pubinervis* or Ash, *Magnolia hypolenca* or *Magnolia*, *Castanea vulgaris*, chestnut, *Alnus firma*, alder, *Betula alnifolia*, Birch, *Quercus acuta*, *gilva* and *glauca* as Oaks, *Diospyros Kaki*, Persimmon, *Pinus Densiflora*, Pine, *Rhus succedaneum* and *vermicifera*, near relative of our *Rhus Tox*.

Paulownia we have established in this country, as also another Japanese, the Gingko (*Salisburia adiantifolia*).

There are also 3 other trees which were represented by sections at the Fair—*Cédrela chinensis*, *Torreya nucifera* and *cinnamomum camphora*.

The Department of Agriculture and Commerce had an exhibition of maps, plans and illustrations of forest growth, woods, plants, wax, resins and wood pulp for paper, bamboo cane and baskets, tanning material, etc. They also had as here represented in the group of the world in the centre of Forestry Hall 2 bamboos, each over 70 feet long.

India's exhibit consisted of many fine pieces of carved wood, usually teak, timber in the rough as well as fashioned to show to best advantage, specimen tans and dyes, oil-bearing substances, gums, resins and fibres.

We will limit this description to timbers, namely, those yielding drugs of our acquaintance and to the carvings.



The great mantel-piece was compound of Shisham wood (*Dalbergia sisso*), Redwood, Walnut, Boxwood, and some fragments of very old Teak and Blackwood, found in some ruins near Madras and dock excavations in Bombay.

The Teak is about 600 years old and the blackwood dates possibly from before the Christian Era.

The carved doorway of teak wood shown there is of same design and general outline of those used in the thrones of different parts of the Mandalay Palace, but the detail is more elaborate than anything the Palace contains.

The triangular space above the door contains designs intended to represent the City of Mandalay with the King and his courtiers.

The lowest tier shows the city wall, with one of the 7 roofed gateways; on and around this are the guardian "nats" of the city and other mythological figures.

The second tier is supposed to represent the King's ministers and the highest represents the King and his Queens in the palace.

It is executed by a Mandalay carver, under direction of Conservator of Forests, Upper Burmah.

Among the timbers were the following arranged in well-seasoned slabs, bark removed from most of them, and in various sizes and shapes—*Acacia*, *Arabica*, *leucophloea*, *sundra* and *Catechu*.

*Acrocarpus fraxinifolius* used chiefly for tea boxes and shingles.

*Ailanthus excelsa* a soft wood like the *Ailanthus glandulosa* common here. This is used by them for sword handles, spear sheaths and catamarans.

For these boats, however, they use a better wood, *Gynocarpus Jacquin*, so light that its weight is but 20 pounds to the cubic foot.

In heavy contrast to this, however, is the *Hardwickia binata*, which is one of their ornamental timbers, and weighs 82 pounds to the cubic foot.

Wabo (*Bamboo gigantea*) is as its specific name implies a gigantic species of Bamboo frequently reaching 125 feet and 25 to 30 inches in circumference and those on exhibition were 64 feet long.

It is chiefly used in light work, scaffoldings, etc.

*Bombax malabaricum* is a curious wood which is white when cut but turns dark on exposure, and strange to say is durable only under water.

*Anacardium occidentale*, another member of our Cashew Nut

family, produces a wood moderately hard, used for packing cases, boat building and charcoal.

Cassia fistula, very durable but not strong enough for timber.

Satinwood, our hair-brush acquaintance (*Chloroxylon Smietenia*) used for everything from agricultural implements to toilet articles.

Cedar (*Cedrela Toma*) is specially adapted to carving and furniture as it is not susceptible to attacks of white ants.

Ebony (*Diospyros ebenum*) for inlaying, making marked contrast, also valuable for furniture otherwise.

Shisham (*Dalbergia sisso*) is a valuable tree for carving, also the species *latifolia* as well as *Melia Azrederach*.

This is held very sacred by the Hindoos and their idols are made from it.

*Cinnamomum glanduliferum* for boat building, etc. *Pterocarpus marsupium* and *Santalinum Strychnos Nux Vomica*, and *potatorum*, all are useful, and Teak (*Tectonia grandis*) is one of their best, for when it is well seasoned it does not crack, warp or split and is not injured by white ants.

*Erythroxyton monogynum* used as a substitute for Sandalwood (*Santal album*) which is highly prized for carvings and incense as well as for perfume.

*Tamarindus indicus* furnishes a rich dark red wood.

Padouk (*Pterocarpus indicus*) is their most valuable tree for construction of furniture, and the Inspector-General of Forests predicts a better future for this than Teak or Mahogany ever had.

Ceylon had no collection of woods in Forestry Hall, but in their Court in Agricultural Building there was quite a fine display which proved uninteresting until the purchase of a Hand-Book of Ceylon Courts, that proved itself the most valuable of its kind, as it treated briefly and pleasantly of the natural history of the island botany, ethnology, language, religion, fibres, etc., agricultural and tea cultivation, besides being valuable for locating the different portions of these exhibits and for describing the different articles on exhibition.

The woods with somewhat familiar names were: *Eugenia bracteata*, *Cassia fistula* and *siamea*, *Melia dubia*, *Diospyros ebenum* and 5 other species, *Mallotus alba*, *Erythroxyton monogynum*, *Pterocarpus marsupium*, *Strychnos Nux Vomica*, *Tamarindus Indica*, *Myristica laurifolia*, *Tectonia grandis*, *Albizzia odoratissima*.

Suringa-mara, one of their hard woods, is used to make pestles and mortars, Sinhalese kind, however. Satinwood (*Chloroxylon Swietenia*) is as abundant and useful here as in India. Another valuable one is the "Nandoon" (*Pericopsis mooniana*) found only in Ceylon.

The Tamarind produces a variegated wood, very ornamental, and but little inferior to Calamander, which is a Persimmon (*Diospyros guesita*) the most attractive cabinet wood in Ceylon.

In this hand-book a chapter is devoted to Native Medicinal Plants and Medicines, and I found it so interesting that I beg to quote a paragraph for the sake of Ceylonese Polypharmacy.

"In most cases the treatment only serves to change an acute disease into one of a chronic character, while recovery from a single affection is protracted, the patient being kept half starved on gruel and made to swallow huge quantities of infusions and decoctions of medicinal herbs villainously compounded, the number of ingredients in each portion increasing in direct ratio with the continuance and severity of the malady."

A mild form of fever, for instance, would be treated with a decoction of the Five Minor Roots—*Desmodium gangaticum*, *Uria lagopodioides*, *Solanum Jacquini*, *Solanum Indicum* and *Tribulus terrestris*—which are believed to cure fever due to deranged phlegm, catarrh, etc.

A severer form would be ascribed perhaps to deranged air, requiring the use of the Five Major plants—*Ægle marmelos*, *Calosanthos Indica*, *Gmelina arborea*, *Stereospermum suaveolens* and *Premna speciosa*.

In remittent fever, etc., all ten may be prescribed together, and in typhoid fever, with head symptoms, all these with eight or ten others.

Many articles of their Pharmacopœia were on exhibition, some not unknown to ours. The display of *Cinchona* Barks and *Cinnamons* were very fine.

The exhibit of New South Wales was the only one in Forestry from Australia, and a glance at it showed the excellent judgment of the Commission in selecting those timbers which are most useful in their Industrial Arts, for their original intention was to show some 19 classes relating to forests and prepared woods, but there were but 6 on exhibition.

Two of the small ones will be considered now and the third later on.

Under Class of Dyes and Tans, there were 3 large collections and strange to say all the Tans were from genus *Acacia*, two (2) of Wattle Bark (*Acacia decurrens*) and one (1) of Hickory (*Acacia penninervis*).

The Wattle of Raymond & Co. analyzed 35.75 per cent. Tannin and 39.5 per cent. extract.

The space allotted Australia was neatly enclosed by a sort of stockade effect in planks, nine (9) feet high and two (2) to three (3) feet wide, polished to half their length or more and labelled in vernacular. The classes of Logs, worked Timber, and ornamental Woods, will be considered together, as the best work of the Director-General of Forestry was with these three (3) classes.

They consisted of various sized specimens sufficient to show best characters of them from the boards forming the outer wall of the exhibit, to herbarium size of wood and bark, 12 x 18 in. Chief of the large timbers were the Mangrove (*Avicennia officinalis*), Swamp Oak (*Casuarina glauca*), Forest Oak (*Casuarina torulosa*), Red Cedar (*Cedrela australis*), Rose Wood (*Dysoxylon Fraserianum*), and 9 species of *Eucalyptus*, *E. botryoides*, Bastard Mahogany, *E. crebra*, Gray Iron Bark; *E. longifolia*, Woolly-butt; *E. macrorrhyncha*, stringy-bark; *E. microcorys*, Tallowood; *E. pilularis*, Black butt; *E. paniculata*; She or Pale Iron Bark; *E. populifolia*, Red box, and *E. resinifera*, Forest Mahogany.

Also these indigenous trees, nine (9) species of *Acacia* of which *decurrens* is the most valuable for tanning purposes, as it yields from 25 to 35 per cent. tannin and is known there as Green Wattle.

*Acacia peuneri* known as Hickory, and *Acacia salicina* as native willow, Apple Tree, *angophora intermedia*, Black Oak as *casuarina suberosa*, Sycamore, *Cryptocorya obovata*, Sassafras, *Doryphora sassafras*, White Tea Tree *Melaleuca leucadendron*, and 18 species *Eucalyptus*.

Of the Herbarium sizes there were 105, showing bark on one side and wood on the other, and included 17 species *Acacia*, 5 *Casuarina* or so-called oaks, 19 *Eucalyptus*, 6 *Melaleuca* and the remainder in genera not specially interesting.

Eighty (80) species, showing Seeds and Seed vessels from the following and others: 10 *Acacias*, 5 *Casuarinas* and 26 *Eucalyptus*, 107 Barks, principally *Acacias* and *Eucalyptus*, 27 of the latter were noted and 5 of former, *Mallotus phillipinensis*, *Duboisia myopo-*

roides, etc. These were about 12 x 18 in., and banded by a thin strip of metal and suspended, when they formed a most pleasing part of this exhibition and the 27 Eucalyptus were the most interesting of the section. For outside the interest with which we consider them in *Materia Medica*, they are a wonderful class to all who stop long enough to compare one species with another, as for instance, the great variation in the bark is of itself startling; there are all gradations from the smoothest to the roughest and most deeply fissured we have in any tree, all to be found in this one genus Eucalyptus, and as strange as the barks were startling, are some of the vernacular names applied to these trees.

Besides those mentioned previously are such as these: Yellow Box, Swamp Mahogany, Blue Gum, Spotted Gum, White Box Bloodwood and Peppermint; consequently they specify this as pipetta.

The commission showed also in another class photographs of their typical trees.

Woolly Butt (*Eucalyptus longifolia*), 230 feet high and 33 feet circumference.

Black Butt (*Eucalyptus pilularis*), 280 feet high and 59 feet circumference.

Spotted Gum (*Eucalyptus maculata*), 300 feet high and 18 in circumference.

Native Fig (*Ficus macrophylla*), 250 feet high and 36 feet circumference.

River Oak (*Casuarina glauca*), 120 feet high and 16 in circumference.

Turpentine (*Syncarpia laurifolia*), 200 feet high and 30 feet circumference.

In conclusion, I might say that there are about 50 species of Eucalyptus, in Australia, and all useful in some way or other, but chiefly in those cases when strength and durability are desired. They resist both fire and water, therefore very little in demand for fuel.

These also rank as the highest trees of the world, as the species *Amygdalina* was found with a diameter of 81 feet and a height of 480 feet, and according to some authorities this is 150 feet higher than the Sequoias of California.

So at this nearly antipodal pinnacle or tree-top, I will leave you to draw your own conclusions, whether or not this World's Columbian Exposition was the most colossal of its kind, and its Forestry feature a pronounced success?

## A METHOD FOR ASSAYING VINEGAR OF OPIUM.

BY LYMAN F. KEBLER, PH.C.

Having prepared a sample of vinegar of opium according to the directions of the United States Pharmacopœia of 1890, I was desirous of estimating the per cent. of morphine it contained. Turning to this authority for instructions, I found the following: "To assay this preparation, transfer 100 cc. of it to a small capsule, add 4 gm. of precipitated calcium carbonate, or such a quantity as will neutralize the free acid, and then proceed further as directed under *Tinctura Opii*."

It is unnecessary here to go into details concerning the method; suffice it to say that the final evaporation is continued until the extract weighs 14 grams.

According to the process of manufacture and final preparation for assay each 100 cubic centimeters contains 20 grams of sugar, about 8 grams of calcium acetate and, making a conservative estimate that the menstruum will extract 50 per cent. of the opium, or 5 grams, giving us a total of at least 33 grams of solids. In fact, when 100 cubic centimeters are evaporated to 50 grams the residue becomes nearly solid. Is the method practical or even possible of execution as it stands?

I have devised a method which has given me very encouraging results, although it has not been applied very extensively. In triple assays of the same sample the following results were secured: 1.220 per cent., 1.237 per cent., 1.213 per cent.

The method is as follows: 100 cubic centimeters of the vinegar of opium are rendered alkaline with strong ammonia water (8-10 cubic centimeters) intimately mixed, 2 cubic centimeters of ether added, to prevent frothing, vigorously shaken for 10 minutes and set aside for 6 hours or overnight. After the alkaloids are completely precipitated, pass through a filter previously wetted with water and wash the precipitate sparingly. While the precipitate is yet decidedly moist transfer it into a small capsule by means of a wash bottle, using as little water as possible. To the contents of the capsule add 10 cubic centimeters of 5 per cent. sulphuric acid or enough to render acid, warm on the water-bath, cool, allow to stand one hour or more, filter and wash the filter and residue well with distilled water. The exact process of the Pharmacopœia can be

followed from here if desired, or evaporate in a tared capsule to 14 grams and proceed from this point as directed in the Pharmacopœia of 1890 from a corresponding point.

It is very desirable, if not necessary, to investigate the purity of the morphine by means of the lime water test.

As a check to the gravimetric method it is recommended to triturate the morphine with a volumetric acid solution.

LABORATORY SMITH, KLINE & FRENCH CO.

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## PHARMACAL PREROGATIVE.

BY WILLIAM B. THOMPSON.

The French pharmacal authorities appear to exercise a more liberal view of the prerogatives of the pharmacist than is accorded in America. The commission to whom is entrusted the additions to, or the revision of, the French Codex had under consideration the preparation of a table of maximum doses of the habitually prescribed medicines for the use of apothecaries. The limitations of this table were never to be exceeded except upon the written order of a doctor. A purpose like this bears upon its face a recognition of the fact that the science of dosage is not only an essential part of the general or complete education of the pharmacist, but that under certain proper conditions he may exercise this knowledge for the benefit (?) of those patrons who are willing to prescribe for themselves, as it were. This does not necessarily involve the function of diagnosis, and should not be implicated with it, but it simply induces the apothecary to invest himself with the knowledge requisite for the exercise, and also gives him an official sanction. We all know that among American pharmacists a disposition to instruct in regard to dose, and other uses of medicine; in other words, to enter the domain of applied medicine, has resulted in straining somewhat the ethical relation with the physician and provoked retaliatory measure. Through this both have suffered, and a breach been created. It is safe, as well as true, to say that in leading or representative pharmacies there is a studied avoidance of what may be deemed to be prescribing, but on the other hand let me ask what would be the measure of estimation in which the knowledge of the pharmacist would be held if he should be compelled to avow an ignorance on

the subject of dosage? Yet, how can he apportion dose without being made aware, to some extent at least, of the conditions requiring it. Thus one degree of knowledge, merging as it were by a natural connection into another, has probably proved to be the step which has served unintentionally to connect the two functions of diagnosing and prescribing, and involved the apothecary, for it is well known by experience and observation that the public are apt at first to resort to the advice of the druggist, and only to the doctor when a final resort becomes necessary.

Subjects like this which we have introduced here, and which involve the relations and offices of the respective spheres of pharmacy and medicine, also involve a principle which should lead to some settlement or adjustment. Liberal and generous minds only can do this. The busy man seldom stops to complain of the innovations of a competitor and rival. Who complains is generally he who has leisure to nurse grievance, and become morbidly sensitive. An active mind will find self-defence in devising ways and means to equalize disadvantages. All fair minds certainly have an ill-concealed contempt for those in either domain—pharmacy or medicine, who assert prerogatives, and assume responsibilities which, did they not menace health and life, would simply be a ridiculous pretension.

*Philadelphia, February 20, 1894.*

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## NEW LOZENGE APPARATUS.

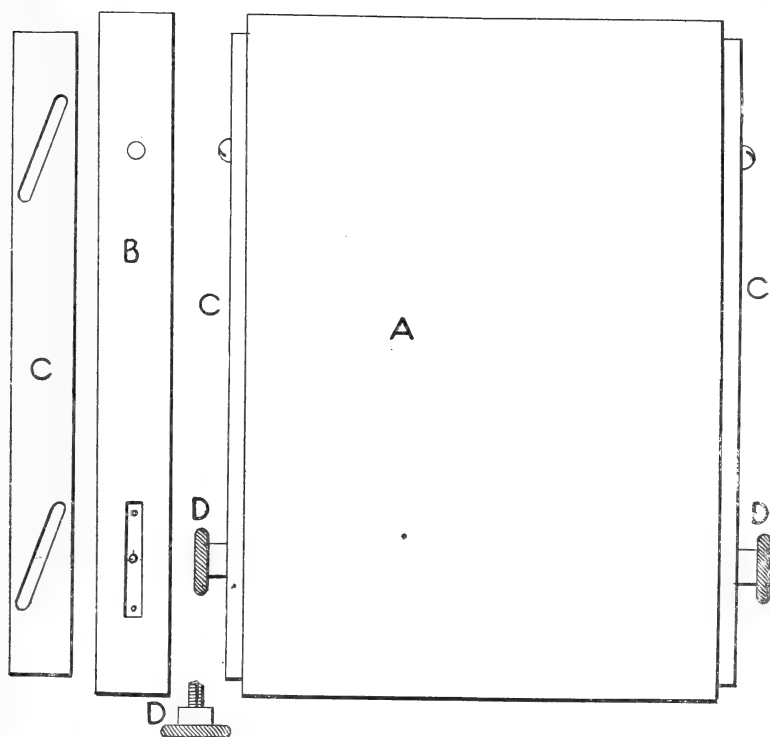
BY WALLACE PROCTER, PH.G.

The annoyance experienced in dispensing lozenges has been long recognized by the practical pharmacist, but has never been obviated as it should be, and to accomplish this in an easy and inexpensive manner, the apparatus here exhibited is offered to the attention of the meeting.

The board is made preferably of a piece of well-seasoned hard wood, one and a half inches thick, ten inches wide, and fourteen long, planed perfectly flat, and both sides and ends made square and true—at each side about three inches from one end a plate is let in flush, and tapped with a screw; on each side a plate of brass one and a half inches wide, fourteen long, and three-sixteenths of an inch thick is fitted; each plate has two slots, crossing the plate diagonally, three-eighths of an inch from each edge; these slots must have exactly the same slope, and through one slot of each



plate a square-shouldered screw passes and is screwed in until it presses the plate close to the side of the board, but still permits it to move easily; through the other slot in each plate a set screw passes and enters the screw plate before mentioned; when the plates have been adjusted to a given height, the set screws are turned until they prevent any motion of the plate. After the lozenge mass has been prepared it is weighed and the weight is then divided by the number of lozenges ordered; the mass is made of the thickness thought



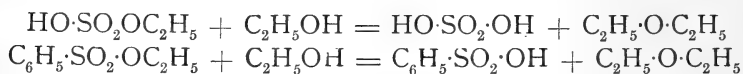
to be right by the operator, the cutter applied, and, if the weight agrees with that ascertained by dividing the entire quantity, the work proceeds at once, but if too heavy the guides are lowered, or if too light they are raised until the proper weight is attained.

The cut illustrates the apparatus very fully. *A* is the board, seen from above. *B* is a side view. *C C* slides in place. *C* a slide detached to show the slots, the front one should be ruled to divisions of the  $\frac{32}{d}$  of an inch. *D* the set screws, one in place and the other detached.

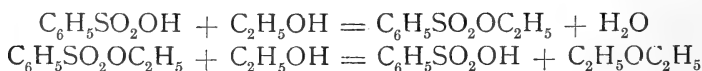
## GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

*The manufacture of ethyl ether* and its homologues by the intervention of aromatic sulphonic acids and based upon extensive research is announced by Professor Krafft. The alkyl esters of sulphonic acid, like the alkyl sulphuric acids, possess the property of forming ethers when heated with alcohols; these reactions are expressed as follows :



Sulphuric acid, as is well known, readily gives up oxygen to oxidizable substances, to which class alcohol belongs. In the sulphonic acids like  $\text{C}_6\text{H}_5\cdot\text{SO}_2\cdot\text{OH}$  the hydroxyl group of the sulphuric acid, which does not take part in the etherification of the alcohol, is replaced by strong radicals like phenyl, naphthyl, etc., which are strongly united with the sulphonic group, in consequence of which these sulphonic acids show a marked stability towards the alcohols towards which they do not act as oxidizing agents but simply as etherifying agents. Sulphuric acid upon heating only reluctantly gives up water and the gradual taking up of more water in the manufacture of ether finally prevents the etherification of the alcohol; the disadvantage is notably reduced by the use of the sulphonic acids which give up the water much more readily than does the sulphuric acid. In the preparation of ether and its homologues the sulphonic acid is heated to the proper temperature and the alcohol allowed to run in; the distillate consists of ether, water and unchanged alcohol; the sulphonic acid is always regenerated and can be used for unlimited periods. The process is illustrated by the reactions :



Experiments have proven that benzene-sulphonic, benzene-disulphonic, *p*-toluene-sulphonic,  $\beta$ -naphthalene sulphonic acids or their esters are suitable for the manufacture of ethers. Benzene sulphonic acid has, without loss of its activity, been used in converting one hundred times its weight of alcohol into ether; under favorable

conditions several thousand times its weight alcohol can be converted into ether. This process, the most continuous of all artificial processes, has another advantage in its practical application, namely, the purity of the products.—(Berichte d. d. Chem. Ges.) Chemiker Ztg., 1893, 1876.

*Picramnia camboita*, Engl.—The crystallizable fat, isolated from the fruit, is the glyceride of an unsaturated fatty acid,  $C_{18}H_{32}O_2$ . See Am. Journ. Pharm., 1893, 379. The same acid, an isomer of stearolic acid, has recently been isolated by A. Arnaud in the seeds of *Picramnia Sow or tariri* (Aublet) and called by him *tariric acid*.—Dr. B. Grützner, Chemiker Ztg., 1893, 1850.

*Test for glucose in urine*.—Small strips of a pure woollen fabric are impregnated with an aqueous ten per cent. solution of stannous chloride and dried at a moderate temperature. If a few drops of the urine be placed upon such a prepared fabric and dried at a moderate temperature, or even over a burner, a dark coloration reveals the presence of glucose; by comparison with the colorations produced with glucose solutions of definite strengths approximately quantitative glucose determinations can be quickly made.—Bruno Bizzari (Gazz. d. Farm.) Pharm. Post, 1894, 35.

*Chloral alcoholate in chloral hydrate* can be detected by warming 1 gr. of chloral hydrate with 1 cc. nitric acid (specific gravity 1.38); pure chloral hydrate will give a colorless mixture; 10–20 per cent. alcoholate in the hydrate produces a yellow coloration, without the application of heat, in from 3–5 minutes; upon heating the color appears after a few seconds; 5 per cent. alcoholate will not give the reaction in the cold but immediately upon warming; 1 per cent. alcoholate, after 3–4 minutes' heating, develops the color followed after about ten minutes by the evolution of yellow fumes. The test for alcoholate may be formulated as follows: One gram of the chloral hydrate covered with 1 cc. nitric acid (sp. gr. 1.38) should not, at ordinary temperature or after warming, produce a yellow colored mixture or emit yellow vapors.—E. Hirschsohn, Pharm. Ztschr., F. Russl., 1893, 817.

*In the estimation of glycerin in fluid extracts* the published methods for estimating glycerin are not suitable, owing to certain plant constituents being extracted and weighed along with the glycerin. Dr. O. Linde publishes the following method, which has proven to give fair results (a loss of 5 or 6 per cent. by evaporation is not to

be avoided) with the fluid extracts of frangula, hydrastis, cascara sagrada and ergot, while the fluid extract of condurango, however, always gave high results, caused by the solubility of one or more of the constituents in water and ether-alcohol; 10 gms. of the fluid extract are evaporated to 5 gms., the residue dissolved in 50 cc. water and solution of lead subacetate added drop by drop until the precipitation is complete; the precipitate is allowed to subside when the clear liquid is filtered through a water-wetted filter and then the precipitate transferred and washed with water; the filtrate is acidified with a few drops of diluted sulphuric acid, a concentrated solution of phospho-tungstic acid added until precipitation ceases and the mixture filtered and washed as before; the filtrate is now made alkaline with dilute solution of sodium hydrate, evaporated to syrupy consistency, 30 cc. of a mixture of equal volumes of absolute alcohol and ether added, the mixture filtered and the insoluble matter washed with ether-alcohol; the ether-alcohol solution is evaporated in a tared flask, having a long neck, and dried to constant weight. The residue is almost pure glycerin contaminated generally with but a little coloring matter.—Pharm. Centrahalle, 1894, 39.

*Pomegranate alkaloids.*—Ciamician and Silber find that the pseudo-pelletierine of Tanret is a tertiary base, in all probability belonging to the class of keton-amines; the products of its reduction are perfectly analogous with those of tropine. The authors propose to change the name "pseudo pelletierine" into "granatonin," to indicate its character as a keton-amine.—(Berichte) Apotheker Ztg., 1893, 625.

*Capsicum.*—Capsaicin exists not alone in the placenta, but also in the outer red integuments; these if very carefully and perfectly freed from the inner membranes are found to possess a very pronounced sharp taste. The following percentages of ether extract were obtained: Outer red coating, 5.96–6.76 per cent.; entire fruit, 8.4–9.26 per cent.; inner coating, 6.02–6.50 per cent., and seeds, 14.20–14.36 per cent. The above statement corrects one made by A. Meyer (Am. Jour. Phar., 92, 100), that the sharp principle was only present in the placenta.—V. Vedrödi (Ztschr. f. Nahrungs-m. Unters.) Apotheker Ztg., 1893, 626.

*The cochineal coloring principle*, recently examined by W. von Miller and G. Rohde again establishes its non-glucosidal nature.

The usual statement that carminic acid is a glucoside decomposing into glucose and carmine-red is proven to be a false one, and the identity of carmine-red and carminic acid is announced; after boiling carminic acid with dilute sulphuric acid for some hours, unchanged carminic acid and a strong reducing substance of unknown composition can be separated, the latter no doubt has been looked upon as a sugar; formic acid was also produced in this decomposition.—(Berichte) Apotheker Ztg., 1893, 638.

*Bulgarian rose oil.*—The chief constituent of the elaeopten is roseol, a primary alcohol of the formula  $C_{10}H_{20}O$  belonging to the olefine series; its acetate  $C_{10}H_{19}C_2H_3O_2$  is a colorless liquid of a different and more agreeable odor than that of oil of rose. The stearopten which, after purification, forms odorless, white crystallized plates, has the formula  $C_{16}H_{34}$ , melts at  $36.5-38^\circ C.$ , congeals at  $34^\circ$  and boils at  $350-380^\circ C.$ —W. Markownikoff and A. Reformatsky (Journ. f. prakt. Chem.) Apotheker Ztg., 1893, 638.

*Cane sugar* was identified as one of the constituents of the root of *Scopolia corniculata*; the melting point of the crystals  $183^\circ C.$  differing from the melting point of the cane sugar as usually accepted ( $160^\circ$ ) led to an examination of the literature on the subject: Berzelius states  $160^\circ C.$ , Peligot  $180^\circ C.$  and E. Merck  $163^\circ$  to  $164^\circ$  (from ipecacuanha). A determination of the melting point of pure cane sugar recrystallized from alcohol, gave by the same method of determination  $183^\circ C.$ —Prof. E. Schmidt, Apotheker Ztg., 1894, 6.

*White ipecac* has been found by A. Andréé in a recent shipment of senega; the former drug containing emetine, attention is directed to this, no doubt accidental, admixture. The sample itself, probably, was obtained from a polygala variety growing in a section of the country along with white ipecac; the senega, which did not uniformly show the characteristic keel, had long, bright violet-colored stem remnants attached.—Apotheker Ztg., 1894, 23.

*The manufacture of salol* by a recent German patent depends upon the formation of salicylide  $(C_7H_4O_2)_4$  and polysalicylide  $(C_7H_4O_2)_n$  by the action of phosphorus oxychloride upon solutions of salicylic acid in indifferent solvents like toluol, etc.; polysalicylide and phenol heated to a temperature of  $210-220^\circ C.$  (best under pressure) react together forming salol, which is afterwards separated by fractional distillation and purified by recrystallization.—Apotheker Ztg., 1894, 40.

*Ozone formation at high temperatures.* The usual method of making oxygen by heating potassium chlorate and manganese dioxide gives a gas having a strong chlorine-like odor, and the statement is frequently made that chlorine is present in the oxygen produced in this way; this odor which could not be due to mere traces of chlorine, led Brunck to make an investigation. The residue, obtained by heating potassium chlorate and manganese dioxide, with water gave a clear and neutral solution (demonstrating that chlorine could not have been liberated as in that case an alkali would either result or some manganese would enter solution as a manganate); the gas after washing with strong potassium hydrate solution not losing its property of bluing potassium-iodide-starch test paper first suggested the presence of ozone which would explain the odor and behavior. It was then demonstrated that ozone was not decomposed at the temperature at which the gas is made and that it could even exist at a red heat if it was not kept at that temperature too long. Perfectly pure potassium chlorate, if heated by itself, will yield a perfectly pure oxygen, but even traces of potassium chloride, silica, etc., are sufficient to cause the formation of ozone; equal quantities of black oxide of manganese and very carefully purified potassium chlorate gave off oxygen containing 0.3 per cent. ozone; the ozone increases with larger quantities of the black oxide, when the proportions are 25 to 1, the oxygen contains 1.55 per cent. ozone. A study of the metallic oxides in connection with this ozone formation showed that the oxides of silver and mercury and peroxides of lead and barium even if heated in atmosphere free from oxygen will yield ozone; other oxides like those of manganese, cobalt and nickel heated in an atmosphere free from oxygen will yield no ozone but will do so if heated in a current of oxygen or if heated with some oxygen liberating substance like potassium chlorate. A remarkable effect is exerted by the alkalis; if small quantities of sodium carbonate, etc., be added to the manganese dioxide and potassium chlorate no ozone is produced; the residue, however, then contains sodium peroxide; if the black oxide of this last experiment be thoroughly washed and used again with potassium chlorate it will not have lost its property of forming ozone.—(Berichte) Apotheker Ztg., 1894, 41.

*Lycetol, lupetazine, dimethyl-piperazine and dipropylene-diamide* are all names given to possible substitute for piperazine; this base is a

liquid and has the formula  $(C_3H_6)_2(NH)_2$ ; it is introduced as the tartrate and pronounced to have at least the same power of dissolving uric acid as is possessed by piperazine; the organic acid is claimed as an advantage as this being converted into the carbonate has a tendency to render the blood alkaline.—Apotheker Ztg., 1894, 76.

*Tricresol*.—A purified mixture of the cresols present in coal tar, soluble in water to the extent of 2.2–2.5 per cent., specific gravity 1.042–1.049 at 20° C.; boiling point, 183–202° C., perfectly soluble in dilute alkali.—Pharm. Ztg., 1893, 751.

*Ferratin*.—An artificial iron-albumen food is made from egg-albumen and an iron salt in the presence of an alkali; it contains seven per cent. iron; it is a red-brown powder almost odorless and tasteless; dose for adults 0.5 gm. three to four times daily.—Pharm. Ztg., 1893, 762.

*Neurodin* or acetyl-*p*-oxyphenyl ethyl carbamate  $C_6H_4(OCOCH_3)(NHCOOC_2H_5)$  and *Thermodin* or acetyl-*p*-ethoxy phenyl-ethyl carbamate  $C_6H_4(OC_2H_5)N(COCH_3)(COOC_2H_5)$  are colorless crystallizable substances, almost insoluble in water and melting at about 87° C.; the former is used especially as an antineuralgic in doses of 0.5–1.5 gm. the latter is used as an antipyretic in doses of 0.5–0.7 gm.—Pharm. Ztg., 1893, 785.

*Mercurial ointment*.—Anhydrous wool-fat forms a splendid basis for extinguishing mercury; it is possible to extinguish 1,000 gms. mercury with 200 gms. anhydrous wool-fat.—E. Buch, Pharm. Ztg., 1894, 40.

*Basic bismuth salicylate*.—Crystallized bismuth nitrate (486 gm.) is dissolved in about four times its weight of dilute acetic acid, diluted with about forty times its weight of water and precipitated with ammonia; the precipitated hydrate is washed by decantation until the test for nitric acid becomes negative, then transferred to a capsule and heated on a water-bath with salicylic acid (138 gm.) when a magma of crystals, having the formula  $BiOC_7H_5O_3$  when dried at 70–75° C. results. Cold water will not decompose the salt so that no reaction with litmus paper or ferric chloride is obtainable; strong alcohol and boiling water will dissolve small quantities of the salt, the solution giving test for bismuth and salicylic acid. All attempts to produce salts of different composition by this method gave negative results.

*Bismuth subgallate* can be made by the same method, using 10

gm. crystallized bismuth nitrate and 3.5 gm. gallic acid; the product has a lemon-yellow color, is free from nitrates and other impurities, and is soluble without residue in sodium hydrate solution; free gallic acid cannot be detected by treatment with alcohol or nitrate by extracting with boiling water; the formula is  $\text{Bi}(\text{OH})_2 \text{C}_7\text{H}_5\text{O}_5$  when dried at 60–70° C.—B. Fischer and B. Grützner, *Arch. der Pharm.*, 1893, 680 and 685.

### ARSENIC IN GLYCERIN.<sup>1</sup>

BY DR. B. H. PAUL AND A. J. COWNLEY.

The presence of arsenic in glycerin has been on several occasions a source of alarm, and the probability that the method of manufacture adopted in the production of glycerin may in some instance give rise to impregnation with more or less arsenic is sufficient to give importance to the subject. Quite recently it has been stated by Mr. Fairley, the public analyst for Leeds, that he has found appreciable amounts of arsenic in the glycerin of commerce. We have, therefore, obtained several samples of glycerin and examined them for arsenic, with the results stated in the accompanying table:

Sample Number.	Result of test applied to the Glycerin (1 cc.) direct.	Result of Test applied after destroying Sulphur compounds by Iodine.	Fraction of a milligramme of Metallic Arsenic in 1 cc. of Glycerin.
1	Stain in 10 mins.	Stain as before.	'01
2	Stain in 16 hours.	Stain as before.	—
3	Stain in 16 hours.	No stain in 16 hours.	—
4	No stain in 16 hours.	—	—
5	Slight stain in 16 hours.	No stain in 16 hours.	—
6	Slight stain in 1½ hours.	Slight stain in 16 hours.	'001
7	Slight stain in 1½ hours.	Slight stain in 16 hours.	'001
8	Stain in 30 mins.	Stain as before.	'01

The samples examined were less numerous than we intended, owing to some promised supplies not having been received, but those above referred to represent the produce of several makers, and it will be seen that, with the exception of No. 1, the amount of arsenic was never sufficient to be a cause of apprehension, while in three of the eight samples there was no indication of the presence

<sup>1</sup> *Phar. Jour. Trans.*, Feb. 24, 1894.



of arsenic. The sample No. 1 was of a character not likely to be met with in ordinary retail trade, being, in fact, the crude material used in the manufacture of nitroglycerin. The largest quantity found in samples Nos. 2 and 8 amounted to only one grain of metallic arsenic in fourteen pounds of glycerin.

It appears, therefore, that with the exercise of due care in applying the test above described, there is really no difficulty in obtaining glycerin practically free from dangerous contamination with arsenic. But it is desirable that this point should be determined by applying the test in all cases.

The ordinary form of Marsh's test is inapplicable for the detection of minute quantities of arsenic, and with all but one of the samples examined we failed to obtain satisfactory indications of the presence of arsenic in the glycerin, which was subsequently found to contain it.

The method of testing employed for this purpose was a modification of that introduced by Gutzeit, which consists in allowing the gas slowly evolved from sulphuric acid and zinc, in contact with the liquid supposed to contain arsenic, to act upon filter paper moistened with a saturated solution of argentic nitrate and placed over the mouth of the test tube in which the reaction takes place. If arsenic is present, arseniatted hydrogen is formed, and a yellow stain is produced upon the filter paper. For application to glycerin this test has been modified by Vulpius, Flückiger and Siebold. Hydrochloric acid is substituted in place of sulphuric, and mercuric chloride is used instead of argentic nitrate. A mixture of two cubic centimetres of the glycerin to be tested with 5 cc. of hydrochloric acid (1 to 7) and 1 gramme of pure zinc is placed in a long test tube, the mouth of which is covered with a disc of filter paper previously moistened with one or two drops of mercuric chloride solution and then dried. If arsenic be present in any considerable amount a yellow stain is produced upon the filter paper after a few minutes, and it subsequently becomes darker. When the amount of arsenic is very minute it is necessary to allow the action to continue for a longer time. Fifteen minutes is considered by Mr. Siebold sufficient for practical purposes, and if no stain is produced in that time the glycerin may be regarded as free from arsenic. But though extremely small quantities, such as  $\frac{1}{100}$  or  $\frac{1}{1000}$  of a milligramme of arsenic, are indicated by this test, we think it is preferable to allow a longer time to elapse in testing.

If the samples examined can be taken as similar to the glycerin generally met with, it would appear that in regard to the amount of arsenic there has been a great improvement since 1890, when Mr. Siebold's paper was published. He then found 1 part in 6,000 or 4,000, and even more, whereas the arsenic in samples Nos. 2 and 8 amounts to only one part in one hundred thousand, and that in the samples Nos. 6 and 7 to only one part in a million.

The circumstance that zinc frequently contains a trace of sulphur which would be eliminated, by the action of acid, in the state of sulphuretted hydrogen, may exercise a disturbing influence in the application of the test. In such a case the quantity of sulphuretted hydrogen will generally be so small that it does not produce a black spot on the filter paper impregnated with mercuric chloride, but a spot having almost the same color as that produced by arseniетted hydrogen. In this way a sample of glycerin that is perfectly free from arsenic may appear to be contaminated.

For this reason it is always advisable to repeat the experiment, adding to the mixture before the zinc is put in, some starch mucilage and a small quantity of iodine solution until a blue tinge is produced. In this way the formation of sulphuretted hydrogen is counteracted. Mr. Siebold<sup>1</sup> has, however, pointed out that the use of iodine for this purpose requires caution, for if too much iodine is added for the destruction of sulphur compounds it interferes with the reaction, and may lead to erroneous conclusions.

In every instance it is, of course, desirable in testing glycerin for arsenic to make a blank experiment, so as to be absolutely certain that neither the hydrochloric acid nor the zinc employed contains any trace of arsenic.

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## ACTION OF SULPHURIC ACID UPON WOOD-CHARCOAL.<sup>2</sup>

BY A. VERNEUIL.

The secondary reactions which accompany the formation of sulphurous and carbonic anhydrides in the reaction of sulphuric acid

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<sup>1</sup> *Pharm. Journ.*, [3], xx, p. 682.

<sup>2</sup> *Comptes Rendus*, 118, 195, through Chemical News.

upon wood-charcoal do not appear to have been hitherto the object of any study.<sup>1</sup>

The black, viscid and non-crystalline product which forms the residue of this operation contains several interesting substances, among which I have already been able to extract, in considerable quantities, two of the principal benzene-carbonic acids, mellic acid (pheno-hexamethyloic acid) and benzene-pentacarbonic acid (pheno-pentamethyloic acid). Their preparation and identification form the object of this memoir.

(1) The formation of these acids seems to me principally connected with the great concentration of the sulphuric acid, and consequently with the temperature of the reaction. Hence it is suitable to effect a rapid escape of the gases to prevent, as far as possible, the reflux into the flask of the water produced during the reaction.

On account of the impurities of charcoal (water, ash, etc.), and to avoid the destruction of the products first formed, by a large excess of sulphuric acid, I used in my first experiments only 1,400 grms. ordinary acid to 100 grms. charcoal.

A thermometer immersed in the liquid shows that the reaction reaches its full intensity about 280°. The temperature rises to 300° only at the end of the operation. The flask is weighed from time to time, and when it only contains from 90 to 100 grms. of matter, which ensues after heating for about six hours, the process is terminated. It is difficult to exceed these limits without the risk of burning the product. The quantity of organic matter which is carried away with the water and the sulphuric and sulphurous acids which distil over is unimportant. When cold the mass is taken up with water which becomes charged with substances of a deep brown color, and leaves a black insoluble matter undissolved, in which no trace of the original charcoal can be recognized. This product, which is soluble in alkalis and in concentrated sulphuric acid, will be the subject of future study.

The sulphuric acid contained in the liquid is eliminated by means of barium chloride, avoiding excess. The clear decanted liquid is then evaporated to dryness. There remains a brown amorphous substance, very acid, the weight of which is about one-fifth of the

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<sup>1</sup> M. Terreil has certainly indicated the formation of a small quantity of an organic acid which sublimes during the preparation of sulphurous acid gas by this process (*Bull. Soc. Chimique*, 2d Series, Vol. II, p. 413).

charcoal originally used. This acid mixture is taken up in water and saturated with ammonia, which precipitates the oxides of iron and manganese, the lime, etc., in the state of basic salts. The filtrate, on strong concentration, deposits crystals of ammonium mellate, which are obtained perfectly pure on three or four recrystallizations from  $1\frac{1}{2}$  parts of water. The yield is about 4 per cent. of the weight of charcoal originally taken.

This ammonium mellate is characterized by its crystalline form, which, according to Wyruboff, is that of an orthorhombic prism, with  $mm. = 114^{\circ} 25'$ ,  $a' p = 151^{\circ}$ ,  $e' p = 160.5^{\circ}$  similar to that described by G. Rose.

The determination of the ammonia, calculated as  $NH_4$ , gives 17.39 per cent. Theory for  $C_6(CO_2)_6(NH_4)69H_2O$ , requires 17.82 per cent.

With barium chloride it gives in a dilute solution a white amorphous precipitate, which is quickly transformed into a mass of fine characteristic needles which after desiccation over sulphuric acid correspond to the formula  $C_{12}O_{12}Ba_36H_2O$ .

I have found that this ammonium mellate is transformed at  $160^{\circ}$  into euchroic acid, which, on a zinc plate, gives the fine characteristic blue color, turning crimson, on treatment with alkalis (Woehler).

These facts prove that one of the acids produced in the oxidation of charcoal by means of sulphuric acid is mellic acid.

(2) I have not found a simple and rapid method for purifying the salts which remain in the brown aqueous solution separated from the crude mellate. The process which I have adopted consists in transforming these ammonium salts into barium salts, in dissolving the latter into hydrochloric acid, then in fractionating the baryta. The brown substances which contaminate these products are thus entirely removed.

To this end the solution of the ammonium salts is evaporated to dryness in presence of a slight excess of barium hydroxide. The basic salts obtained are then dissolved in the cold in HCl diluted with ten parts of water. To this liquid is added a hot concentrated solution of baryta until the formation of a permanent precipitate. After this the precipitation is fractionated by adding to the liquid a solution of 30 grms. barium hydroxide per kilo of charcoal used.

The first precipitate, separated the next day from the supernatant

liquid, carries down with it the chief part of the brown products. On continuing this fractionation until the liquid becomes alkaline, we obtain five precipitates less and less deeply colored. The two first are crystalline, the three latter gelatinous.

Leaving for the present the three last amorphous precipitates, as well as the barium salt which remains in solution in the ultimate alkaline liquid, I will merely now examine the two crystalline precipitates, which are similar enough to be united together.

They give, in dilute HCl, a brown solution, which on concentration deposits an acid barium salt crystallized in needles mixed with barium chloride. These two salts are easily separated from the brown products, and they are obtained quite white after three or four recrystallizations in dilute HCl. They are then decomposed by equivalent quantity of sulphuric acid. The barium sulphate is filtered off, the liquid evaporated to dryness to expel hydrochloric acid, and the residue, on a final crystallization from water, yields pure pheno-pentamethyloic acid. The yield is three per cent. of the weight of the charcoal used. This acid, first obtained by Friedel in 1880, by oxidizing pentamethylbenzene by means of potassium permanganate is very soluble in hot water, from which it is deposited in fine silky needles. It is soluble in alcohol and ether; it effloresces in the air, and loses 27.56 per cent. of water over sulphuric acid. The quantity of water calculated for  $C_6H(CO_2H)_5 \cdot 6H_2O$  reaches 26.60 per cent.

If dried at  $110^\circ$  it agrees with the formula  $C_6H(CO_2H)_5$ . On saturation with ammonia it precipitates barium chloride; like the corresponding mellate, the amorphous precipitate is not spontaneously converted into crystals. Its alkaline salts give, with silver nitrate, a precipitate which on desiccation contains 64.38 per cent. of silver. This salt deflagrates if heated, yielding a black voluminous pulverulent matter, which on roasting leaves a mass of pure silver.

This acid requires for saturation 93.46 per cent. KOH. These data suffice to characterize pheno-pentamethyloic acid.

To complete this investigation it remains for me to purify the fractionation baryta products, which I have not yet been able to examine, and to determine if the acids just described are really derived from carbon, or if they are merely the results of hydrogen products which an incomplete calcination always leaves in wood-charcoal.

## MINUTES OF SPECIAL MEETING OF THE COLLEGE.

FEBRUARY 16, 1894.

In conformity with notice duly given, a special meeting of members of the College was held this day at 11 o'clock, A.M. Charles Bullock presided, and twenty-seven members were present. The Chairman stated that the object was to take such action as was made necessary by the death of William B. Webb, late Treasurer, and spoke in terms of eulogy of the deceased. Attention was likewise called to the fact that during the interim between the present time and the date of the annual meeting in March next, it would be necessary to have a Treasurer pro tempore. Nominations being solicited, Howard B. French presented the name of James T. Shinn, Professor Remington that of W. Nelson Stem and Jas. T. Shinn that of Henry N. Rittenhouse. Votes were then cast for the respective candidates, Mahlon N. Kline and Dr. C. A. Weidemann being appointed tellers.

James T. Shinn offered the following resolutions, which were adopted, and the Secretary requested to carry out the instructions therein contained :

WHEREAS, An All-wise Providence has removed from our midst by death one of our oldest members, and a faithful officer of the Philadelphia College of Pharmacy ; therefore, be it

*Resolved*, That in the death of William B. Webb our College has lost a true friend, a wise counsellor and a most efficient executive officer. His devotion to the interests of his *Alma Mater* has been marked and his unflagging zeal has merited the approbation of his fellow-members.

*Resolved*, That the Philadelphia College of Pharmacy, through its officers, tender to the family of our deceased Treasurer their heartfelt sympathy in this bereavement.

*Resolved*, That an engrossed copy of these resolutions be presented to the family, and that an engrossed copy be also permanently placed in the library of the College.

The tellers being called upon to announce the result of the election for Treasurer pro tem., stated that Mr. James T. Shinn had received the highest number of votes, whereupon Mr. Shinn was declared to be elected, and upon resolution the election was made unanimous.

The Chairman presented the following resolution.

"That the executors of the estate of the late Treasurer of the Philadelphia College of Pharmacy, William B. Webb, be and they are hereby requested to transfer to James T. Shinn, Treasurer of the College, the moneys, papers, and other property which were in possession of the late Treasurer at the time of his decease."

Resolution carried. An attested copy of this resolution to be furnished the Treasurer-elect.

Mr. Shinn accepted, with some remarks. At the suggestion of the Treasurer-elect permission, by resolution, was given to him to transfer funds and papers of the College, from their present place, to the custody of the Provident Life and Trust Company, No. 401-409 Chestnut Street.

Dr. C. B. Lowe spoke of William B. Webb, his relations to the College, paying a high tribute to the worth of his character. Mr. Andrew Blair referred to

a life-long association and fellowship, and dwelt eloquently upon the fidelity and integrity with which William B. Webb performed all the duties of life and of public trust. Prof. Remington followed, stating that the Board of Trustees had placed upon their records a sense of personal loss, and of that which the College had sustained in the demise of the late Treasurer. Mr. Howard B. French referred to the faithful service which the deceased had rendered in the manifold duties pertaining to his connection as an officer, member and ardent friend of the College, and finally Mr. M. N. Kline expressed, briefly, the extent of loss sustained when an institution becomes thus deprived of the service of one long-tried, and found faithful to every duty. On motion, it was resolved that the Committee on Library be requested to have placed in suitable position a portrait of the late Treasurer of the College.

Meeting adjourned, on motion.

WILLIAM B. THOMPSON,  
*Secretary.*

## AMERICAN PHARMACEUTICAL ASSOCIATION.

*Special Membership Committee.*—"The following motion was adopted at the Chicago Meeting of the American Pharmaceutical Association." That the President be instructed to appoint a *Special Membership Committee* to consist of one member from each State and Territory and one each from the District of Columbia and the Provinces of Nova Scotia, Ontario and Quebec. The duty of said Committee shall be that of soliciting new members in their respective sections of country. They will report to and act under the direction of the Chairman of the Council, Prof. J. M. Good, St. Louis, Mo., and the Chairman of the Committee of Membership, Prof. Charles Caspari, Jr., Baltimore, Md. Considerable time has been required to secure the acceptance of distant appointees, but the earnest and enthusiastic letters received from many indicate that the great advantages of Membership are appreciated, and the present year promises to be one of exceptional progress in this direction. The thanks of the Association are due to Prof. Whelpley for the practical suggestion.

The following-named members have accepted the appointment: Alabama, Philip C. Candidus, Mobile; Arizona, Clemens L. Eschman, Phoenix; Arkansas, Wm. W. Kerr, Russellville; California, Prof. Wm. M. Searby, San Francisco; Colorado, Chas. S. Kline, Denver; Connecticut, Chas. A. Rapelye, Hartford; Delaware, John M. Harvey, Wilmington; District of Columbia, Saml. L. Hilton, Washington; Georgia, Dr. Henry R. Slack, La Grange; Idaho, Albert O. Ingalls, Murray; Illinois, T. H. Patterson, Chicago; Indiana, Josiah K. Lilly, Indianapolis; Iowa, Mrs. Rosa Upson, Marshalltown; Kansas, Mrs. M. O. Miner, Hiawatha; Kentucky, Dr. Wiley Rogers, Louisville; Maine, Edward A. Hay, Portland; Louisiana, Alex. K. Finley, New Orleans; Maryland, Prof. D. M. Culbreth, Baltimore; Massachusetts, Prof. W. L. Scoville, Boston; Michigan, Arthur S. Parker, Detroit; Minnesota, James C. Hening, Stillwater; Mississippi, John C. Means, Natchez; Missouri, Prof. H. M. Whelpley, St. Louis; Nebraska, James Reed, Nebraska City; Nevada, William A. Perkins, Virginia City; New Hampshire, Andrew P. Preston, Portsmouth; New Jersey, Wm. C. Alpers, Bayonne; New Mexico, James A. Kinneer, Deming; New York, Caswell A. Mayo, New York City; North Caro-

lina, Henry M. Cheers, Plymouth ; Ohio, Louis C. Hopp, Cleveland ; Oregon, Geo. C. Blakely, The Dalles ; Pennsylvania, Prof. Frank G. Ryan, Philadelphia ; Rhode Island, Henry J. Alfreds, Providence ; South Dakota, Irvin A. Keith, Lake Preston ; Tennessee, James O. Burge, Nashville ; Texas, L. Myers Conner, Dallas ; Utah, Frank A. Druehl, Lake City ; Vermont, Henry A. Chapin, Brattleboro ; Virginia, Edmund R. Beckwith, Petersburg ; West Virginia, Edwin L. Boggs, Charleston ; Wisconsin, John A. Dadd, Milwaukee ; Wyoming, Thos. G. Maghee, M.D., Rawlins ; Quebec, Seraphin Lachance, Montreal ; Nova Scotia, Francis C. Simson, Halifax ; Ontario, John Lowden, Toronto.

Every Pharmacist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Botany and Chemistry, who may be especially interested in Pharmacy, and *Materia Medica*, who, after duly considering the objects of the Association, and the obligations of the Constitution and By-Laws, are willing to subscribe to them, are eligible to membership.

The large volume of proceedings issued annually to the members containing the valuable and exhaustive report on the Progress of Pharmacy, embracing all of prime value that has appeared in the leading Chemical and Pharmaceutical journals in this country and Europe, is of greater value than the membership fee.

It is hoped that the Druggists of each section will have a local pride in aiding the members of the committee representing them to present to the next annual meeting at Asheville, N. C., the largest accession of members ever secured.

The following sections have not responded, and the President would be pleased to have volunteers offer their services.

Florida, South Carolina, Washington State, North Dakota and Wyoming.

EDGAR L. PATCH,

*Boston, January 1, 1894.*

*President.*

*Pennsylvania Pharmacy Board.*—The State Pharmaceutical Examining Board of Pennsylvania held an examination in the Central High School, at Philadelphia, on Saturday, January 20, 1894.

Three hundred and forty candidates appeared for examination, one hundred and sixty-seven applying for Registered Pharmacist Certificates, and one hundred and seventy-three for Qualified Assistant Certificates. Twenty-six of the former and sixty-four of the latter class were successful.

The next examination will be held at Harrisburg in April. Applicants for examination should apply to the Secretary of the Board, Charles T. George, Harrisburg, Pa., after the middle of March, for the necessary blank form of application, and the exact time and place of the examination. Applicants should always state, when applying for blanks, for which certificate they wish to be examined.



## MINUTES OF THE PHARMACEUTICAL MEETING.

Minutes of the Pharmaceutical Meeting, held in the Philadelphia College of Pharmacy, February 20, 1894, Edwin M. Boring in the chair. The minutes of the last meeting were read and approved. Donations to the Library were received as follows, and a vote of "Thanks of the College" was made to the donors:

### DONATIONS TO LIBRARY.

Government Reports. Department of Agriculture. Report of the Botanist. 1886, 1888, 1890, 1891, 1892.

Contributions from U. S. National Herbarium. Vol. I, Nos. 4, 5, 7, 8; Vol. 2, Nos. 1, 2; Vol. 3, No. 1; Vol. 4, Bulletin, Nos. 3, 6 (Grasses).

Special Bulletin (Agricultural Grasses and Forage Plants).

### DIVISION OF BOTANY.

Illustrations of N. A. Grasses. 2 Vols. 4to.

Consular Reports. Vol. 44, No. 160. January, 1894. Vol. 44, No. 161. February, 1894.

### SMITHSONIAN REPORTS.

Internal Work of the Wind. (Langley.)

Proceedings U. S. National Museum. Vol. 15. 1892.

Bulletin U. S. National Museum. Nos. 44, 45, 46. 1893.

### U. S. BUREAU OF EDUCATION.

History of Education in Delaware (Powel.) 1893.

Reports on Secondary School Studies. 1893.

From Prof. Sadtler. Simon's Man. of Chemistry.

From Baron von Mueller. Extra Tropical Plants. Census of Australian Plants. Part I.

Dr. H. W. Jayne, chemist and manufacturer of Coal Tar Products, read a very interesting and instructive paper on "Crude Carbohc Acid," exhibited sections of wood-piling, creosoted and not creosoted, and in reply to many questions much interesting information was elicited. It was thought that naphthaline had little or no preservative influence on wood. Several distillates, each having different boiling points and used in mechanical arts as solvents, etc., were called Naphtha.

Joseph Crawford, Ph.G., read a paper in continuation of "Forestry at the Columbian Exposition." His painstaking labor will insure careful reading by every one. Beautiful samples of wood from many exhibits were shown.

Charles C. Manger read a paper on a crystalline principle from *Eupatorium purpureum* and exhibited a sample.

Mr. Boring said the meeting would be gratified by the reading of this and other papers of this nature, and they were typical and praiseworthy as showing the progress of work in the College laboratory; while 25 years ago, we read papers of such work from German laboratories.

W. B. Thompson spoke of the acoustic properties of the museum and moved

the attention of the committee on property be called to this, with the view of having it remedied, and read a paper on Pharmacal Prerogative.

The discussion of this paper elicited the fact that the public had considerable confidence in the judgment of apothecaries, and it was shown that physicians were apt to judge hastily when emergencies required the knowledge of doses and therapeutic effect of important drugs.

Wallace Proctor gave a description of a lozenge apparatus.

Mr. L. F. Kebler read a paper on assay of vinegar of opium and sample of assay.

A vote of thanks was given to the writers of these papers and all were referred to the Publication Committee.

WILLIAM MCINTYRE,  
Registrar, *pro tem*.

## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*Auto-intoxication in Disease.* By Ch. Bouchard, translated by Thomas Oliver. 8vo. pp. 302. Philadelphia: F. A. Davis Company. London: F. J. Rebman.

The subject is treated apparently with great care, and with a closeness of detail that inspires confidence in the author's conclusions. It is entirely without the pale of the pharmacist's duty and belongs especially to the diagnostician where we leave it. The book is well printed and bound.

*Stewart's Quiz Compend of Pharmacy.* Fourth revised edition, embracing the changes of the seventh decennial revision of the U. S. Pharmacopœia. Philadelphia: Blakiston, Son & Co. 16mo, pp. 181.

The students of pharmacy will gladly welcome the appearance of a new edition of this work as being a great help to them in preparing for examination, and if it is used only as a help it is all right.

We have received a leaflet, from M. C. Tanret, reprinted from the Journal of Pharmacy and Chemistry, of Paris, giving a complete summary of the value of potassium iodohydrargyrate and potassium tri-iodide. The following classes are especially noticed, Alkaloids, Glucosides, Albuminoids, Albumin, Peptones, Gelatin, Casein and Ammonia.

*The Physician's Wife.* By Ellen M. Firebaugh. Philadelphia: F. A. Davis Company, 1914-1916 Cherry Street. 8mo, pp. 200.

A lively picture of the trials that beset the *better* half of the Country Doctor. The apothecary cannot, of course, appreciate this as will the physician, who will doubtless hand it over to his wife for perusal when her numerous duties subside sufficiently to permit her to enjoy its racy pages.

*Calendar of the Pharmaceutical Society of Great Britain* 8vo, pp. 552. London: Bloomsbury Square.

This work contains a calendar noting under the appropriate dates the various matters of interest to the members of the Society, the meetings of the various committees, the holidays, dates of examinations, the historical sketch of the

society, the charter of the society, the various acts relating to pharmacy, sales of poison and registration, the lists of members, students, prize men, tables of weights and measures, subscribers to the Benevolent Fund and Orphan Fund.

*A System of Instruction in Qualitative Chemical Analysis.* By Arthur H. Elliott, Ph.D., Professor of Chemistry and Physics, and Director of the Chemical Laboratory in the College of Pharmacy of the City of New York. Second edition. Published by the author. 1894. 8vo, pp. 120.

The first edition of this work appeared a little over a year ago, and was reviewed in this Journal, 1893, p. 107. What was said of the book then, is true of this edition; and the fact that a new edition is demanded after the lapse of so short a time, is evidence that many teachers and students have found the work a useful one. H. T.

*An Illustrated Encyclopædic Medical Dictionary*, being a dictionary of the technical terms used by writers on medicine, and the collateral sciences in the Latin, English, French and German languages. By Frank P. Foster, M.D., with the collaboration of Wm. C. Ayres, M.D.; Edward B. Bronson, M.D.; Chas. Stedman Bull, M.D.; Henry C. Coe, M.D.; Andrew F. Currier, M.D.; Alex. Duane, M.D.; Simon H. Gage, M.D.; Henry J. Garrigues, M.D.; Chas. B. Kelsey, M.D.; Russell H. Nevins, M.D.; Burt G. Wilder, M.D. Vol. IV. New York: D. Appleton & Co. 1894. 4to. Pp. 2321 to 3096.

This volume completes a valuable and elaborate work, which cannot but be appreciated by everyone connected with the science of medicine. Partaking of an encyclopædic character, it becomes much more interesting than an ordinary dictionary. Illustrations have been inserted wherever they were found necessary to elucidate the text. The frontispiece consists of a handsome colored plate, illustrating urinary sediments. The first word of this volume is *Minnequa Springs*, and from this to the last, *Zythum*, there is not one too many. The following are a few of the titles that have received especial attention, and are of particular interest to the pharmacist: *Pilula, Opium, Morphine, Quinine*. A good example of the thoroughness of the work is shown under opium, where every known pharmaceutical preparation with its synonym appears to have been given. A very valuable feature of the book is the concise but clear definitions of the newer synthetic remedies. Just so much chemistry concerning them has been included, as to furnish the busy professional man with necessary information, without surrounding them by too technical language. Sixteen pages of supplement bring the whole down to the latest date possible.

Of course, such a work is not absolutely without errors. For instance, *Quercus Prinus* is given as "(yellow) Swamp Chestnut Oak." This species, however, is not yellow, and its habits are far from swampy, as it strongly inclines to rocky hillsides. *Q. Muhlenbergii* has yellow wood, and *Q. bicolor* is a chestnut oak that is found in swampy localities.

Under *Wintergreen* it is stated that the oil "when pure consists of 90 per cent. of methyl salicylate and 10 per cent. of gaultherilene." More recent investigators have shown that the latter constituent does not amount to one per cent. of the oil. A few cases of wrong pages in references, and improper spelling of authors' names, have been noticed. The mechanical part is of that high class which characterizes the Appleton Press. H. T.

*The National Dispensatory*, containing the natural history, chemistry, pharmacy, actions and uses of medicines; including those recognized in the Pharmacopœia of the United States, Great Britain and Germany, with numerous references to the French Codex. By Alfred Stillé, M.D., LL.D., John M. Maisch, Ph.D. (late Professor of Materia Medica and Botany in the Philadelphia College of Pharmacy), Charles Caspari, Jr., Ph.G., and Henry C. C. Maisch, Ph.G., Ph.D. Fifth edition. Philadelphia: Lea Bros. & Co. 1894. Large 8vo, pp. 1903.

The previous editions of the above work have been fully commented upon in this Journal for the year 1879, 1884 and 1887. In general arrangement, the new issue remains unchanged, and although only 122 pages larger than the previous edition, the work, as a whole, is most comprehensive and up-to-date in its information, fully maintaining its past reputation for accuracy, completeness, convenience, and absence of obsolete matter. Of national interest, then, in medical and pharmaceutical circles, is this new edition of *The National Dispensatory*. It gives not only a description of the natural history, chemistry and pharmacy of drugs and drug-actions of our own Pharmacopœia, but comments as well upon those of foreign origin. It has had many of its old articles re-written, and a large number of new ones introduced. Chemical and pharmaceutical processes are fully described, and descriptions of apparatus and tests given. The official formulas for galenical preparations seem to be fully explained, and separate formulas in customary weights and measures are added.

This latter action is to be regretted. Whilst the use of "separate formulas" is less objectionable than the former plan of inserting "equivalents" in the metric formulas, the practice will certainly handicap the general introduction of the metric system of weights and measures. Pharmacists should learn to think in and use the gram and cubic centimeter, and many will never do so with ready-made equivalents accessible.

*The National Dispensatory* has been in existence for fifteen years, and probably in no such period of time before has such a host of new remedies been introduced. The trend of modern medical practice is undeniably in the direction of synthetical compounds; and these, like the stars, are almost without number. No better evidence of this tendency in medical practice can be had than in the number of "synthetics" referred to in this work; and the wonderfully comprehensive manner in which they are described, deserves the warmest of praise. It may not be amiss, in the review, to here name a few of the more prominent and comparatively recent ones.

Antipyrine is, of course, mentioned, and also its allied compounds: Agathin, Antithermin, Benzopyrine or Antipyrine Benzoate, Iodopyrine, Phenopyrine, Picropyrine, Naphthopyrine, and Salipyrine or Antipyrine Salicylate. Acetanilid is described, and also certain allied compounds: Bromacetanilid, Benzanilid, and Methyl-acetanilid or "Exalgin." A process for the last named is given (p. 9). Phenacetin or Para-acetphenetidin is referred to, as are Methacetin, Hydracetin, Phenylhydrazine and Phenocoll Hydrochloride. Phenocoll Salicylate, which seems to be coming into use, is not mentioned.

Urethane or Ethyl Carbamate, and Ural or Chloral-Urethane are given. "Somnal" is defined as Ethylated Chloral-Urethane, a definite chemical compound. It has been reported to be simply a solution of chloral and urethane in alcohol (Merck's *Report*, 1893, p. 8). Mention is also made of Euphorin or

Phenyl Urethane, a non-toxic antipyretic. (This should *not* be confounded with Europhen or Iso-Butyl-Ortho-Cresol Iodide, an iodoform substitute containing nearly one-fourth combined iodine). The *Dispensatory* errs, most decidedly, in calling Phenyl Urethane—*Euphorin* (p. 1674); and the greatest care should be exercised by the pharmacist to neutralize this blunder, as Europhen—with which *Euphorin* is likely to be confounded—brought in contact with water, splits up into iodine, and a new and soluble iodine compound. The dangers of administering free iodine in the form of 1 to 2 gram doses of Europhen, when *Euphorin* is wanted are too obvious to need mention.

"Aristol" is referred to as Dithymol-diiodide or Annidalin, and a process for making is given (p. 879). "Antiseptol" or Cinchonine Iodosulphate, Iodol or Tetraiodopyrrol—one of the oldest of iodoform substitutes—Soziodol, Sozal, Sulphaminol and Thiophene are described. "Dermatol" is given a synonym of Bismuth Subgallate, and a process of manufacture is detailed (p. 345). "Diuretin" is defined as Sodio-Theobromine Salicylate, and has a process of making given (p. 1481). "Diaptherin" (*not* Diphtherin), or Oxyquinaseptol is mentioned, and the method of obtaining it given (p. 451).

The following are also reviewed: Alummol, Naphtol, Benzonaphtol, Betol or Salinaphtol, Hydronaphtol, Thiol—the German artificial Ichthyol—Tumenol, allied to Ichthyol, Lysol, Creolin, Naphtalin and derivatives, Piperazine—the uric acid solvent—Resorcin, Terebene, Terpin Hydrat, Camphoric Acid, Paraldehyde, Metaldehyde, Sulphonal and allied hypnotics—Trional and Tetronal, Guaiacol and Guaiacol Carbonate, Benzoate and Salicylate, Chloralamide, Cocaine Phenylate, etc.

Under Ethylene Bromide (p. 141) the too-common error is repeated of describing it as "a faintly brown-colored liquid." The pure compound is a *colorless* liquid, readily decomposable into iodine and other products. Its boiling point is stated to be 131° C. Wöhler gives it as 129° C.

One of the most valuable features of *The National Dispensatory*, in the past, has been its up-to-date references concerning plant constituents. This reputation seems to have been well maintained in the present issue, save in some few cases.

Under the composition of volatile oil of juniper (p. 1127) the indefinite statement is made that it is a mixture of ( $C_{10}H_{16}$ )—hydrocarbons differing in boiling points. Flückiger (1888) has shown that it is composed essentially of two hydrocarbons, the more abundant of which when heated to 270° is changed to a hydrocarbon ( $C_{10}H_{16}$ ) corresponding to cinene of oil of wormseed.

Under oil of hedeoma, the statement only is made that it "contains oxygen, but its exact composition has not been ascertained," despite the excellent work of E. Kremers (A. J. P., 1887, p. 535), and F. W. Franz (A. J. P., 1888, p. 161), who found hedeomol, and formic and acetic acids. Franz also found certain oxygenated liquids. Kremers believes that isoheptioic acid is present.

Further, whilst reference is made under the constituents of Caulophyllum to the experiments of Lloyd, anent the alkaloid caulophylline—reported by him to the American Pharmaceutical Association last August—no mention is made of leontin, a compound related to saponin, previously isolated by Lloyd, and mentioned in the discussion following his paper on Caulophylline. (See Proceedings, A. P. A., 1893, p. 117.)

In the description of the properties of morphine acetate, the statement is

made that, freshly made, it dissolves at 15° C. in 25 parts of water and 476 parts of alcohol (U. S. P.) This is an obvious typographical error; 25 parts of the first named, and 476 parts of the second named are meant.

The appendix contains a number of new and valuable tables, and an alphabetical list of official drugs of the United States and British Pharmacopœias, showing contained preparations. A list is also given of over four hundred formulas and molecular weights of chemical compounds. The indices show 25,000 references, and the typographical make-up of the book is well worthy of the high reputation of the house issuing it.

J. W. ENGLAND.

*Proceedings of the Twelfth Annual Meeting of the Virginia Pharmaceutical Association.*

A copy of the above has just reached us. It details the minutes of the meeting held at Blue Ridge Springs, September 13 and 14, 1893. The noteworthy paper in this volume is entitled "A Few Facts and Points about Quinine, Gathered Here and There, and Strung Together by Robert Brydon." The author of this unique contribution has succeeded in collecting facts and statistics about one of the greatest of the alkaloids, that will well repay one for reading. He has drawn his information from a great many sources, notably from some of our large manufacturing houses, whereby the value of his communication is especially increased.

*The Modern Climatic Treatment of Invalids with Pulmonary Consumption in Southern California.* By P. C. Remondino, M.D. Pp. 126. Detroit: George S. Davis. 1893.

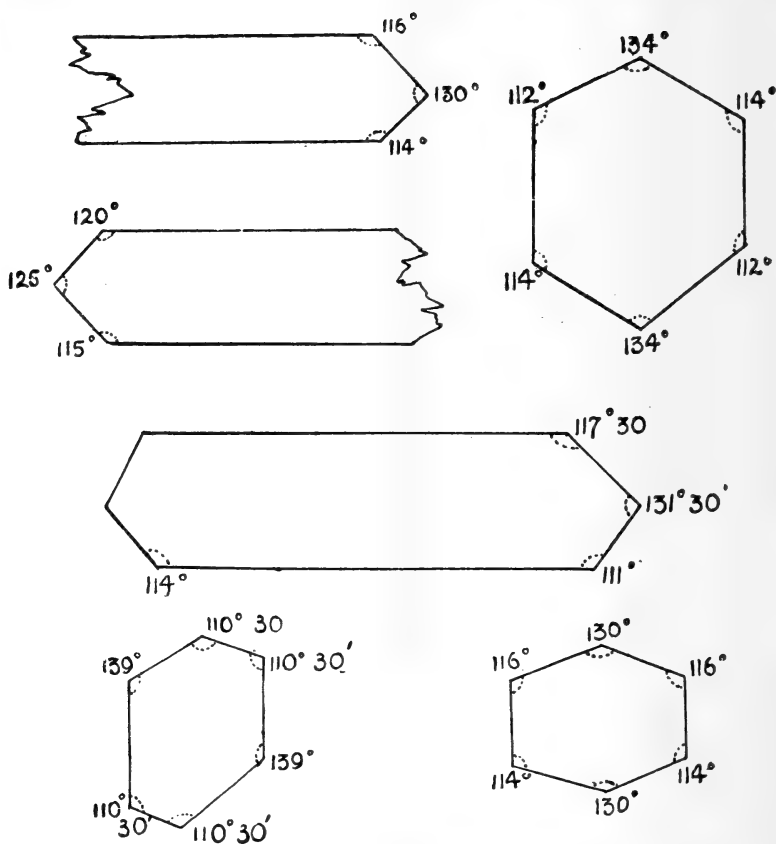
A very readable book, which is of interest to the ordinary tourist as well as to the invalid, since it gives some very sensible advice about travelling in general, which every one should know, especially that which refers to dress and diet.

*The Georgia Board of Pharmacy* met in the Senate Chamber of the Capitol, Atlanta, February 26. Messrs. Goodwyn, Sharp, Payne and Slack were present and conducted the examination of ten applicants, six of whom passed and four failed. The successful candidates were: Messrs. W. M. Caldwell, Chipley; O. B. Hartzog, Atlanta; R. C. Hood, Harmony Grove; H. T. Mash, Savannah; R. K. Nipper, Bainbridge, and L. C. Newman, of Atlanta. Mr. O. B. Hartzog made the highest mark and was awarded the complimentary interstate certificate. The Board also took action on the adulteration law and hopes soon to enforce the same throughout the State. Complaints should be made to Dr. George F. Payne, State Chemist, Atlanta, or Dr. H. R. Slack, Secretary, Lagrange.

The Sprague medal and the prize membership in the A. P. A. will be awarded when the Board meets with the Georgia Pharmaceutical Association in Americus, May 7.



Plate I.



A



B

Solnine, from *Solanum Carolinense*



# THE AMERICAN JOURNAL OF PHARMACY

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APRIL, 1894.

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SOLNINE.<sup>1</sup>

J. U. LLOYD.



*Generalities.*—Botanical relationships are often accompanied by similarly constituted proximate constituents. Thus, the roots of the several species of trilliums are astringent and very close in physical appearances and in character chemically. The Berberidaceæ, as a rule, contain the alkaloids, berberine and also a white alkaloid that is invariably associated therewith.<sup>2</sup> The cinchonas contain several alkaloids, all bitter, that are in turn closely related. The arums contain acrid principles familiar in the acidity of Indian Turnip. The Rhamnii contain similar classes of extractive and resinous materials and the barks of the different species are, as a rule, laxative. It does not follow, however, that exceptions cannot occur, even in close botanical affiliations, for here and there plants closely related differ markedly from other members of a family. Notwithstanding these exceptions, it may be said, however, that systematic investigation in plant constituents is no longer impossible, and that as a rule botanists, chemists and pharmacists can work together understandingly, each in his proper field and each aiding and in turn leaning on the others.

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<sup>1</sup> Read at the December Meeting of the Cincinnati Section of the American Chemical Society.

<sup>2</sup> This white alkaloid has been named hydrastine when obtained from *Hydrastis*, Oxycanthine when obtained from *Berberis vulgaris*, unnamed when obtained from *Berberis aquifolium*, Coptine when obtained from *Coptis trifolium*. The relationships that the white alkaloids, as derived from the various sources, bear to berberine, have never been determined.

Some years ago my brother, Mr. C. G. Lloyd, asked me to investigate the plant *Stylophorum diphyllum*, a member of the papaveraceæ, predicting from its relationship, botanically, that it would prove to be an alkaloid bearing plant. The result was the discovery of an abundance of an alkaloid now known as *Stylophorine*, which was supplied to Professor Eykmann, of Tokio, Japan, who was studying the relationships of the products of that natural order and who established its chemical position.

Repeated investigations with other plants, instituted at the suggestion of my brother, have also resulted in the discovery of unseen and yet clearly foretold products. Usually success has crowned such efforts, and it may be said that research in this direction can be made with considerable certainty and rendered quite systematic under a clear understanding of botanical relationships in connection with allied plant constituents. Some years ago he asked me to investigate *Solanum Carolinense*, predicting that it would prove to contain an alkaloid.

This plant is well known to country people as "poison or ground potato," "horse nettle," and "tread soft." It is reputed to be a poison, and animals of all kinds refuse to eat it, which perhaps establishes the grounds for its lethal reputation.

*Medical History.*—For a long time the plant has been considered a domestic remedy for "fits" and convulsions among the negroes of the South. It was introduced as a medicine to the profession in 1889, by Dr. J. L. Napier, of Blenheim, S. C., who presented a paper on the subject to the Medical Association of South Carolina. Dr. Napier began the use of it in 1887, having learned of its reputed virtues in the hands of the negro population. He found the root and berries to check convulsive disorders, especially with females when occurring at the menstrual period. Tablespoonful doses of a whiskey and water preparation were administered to a life-long epileptic, the disorder previously appearing with each catamenial epoch, with the result of completely checking the trouble, which did not return. The remedy was continued seven months afterward. Equally good results in other cases led him to try it in both puerperal and hysterical convulsions with satisfactory results. He used it in a case of chorea, and has seen a case of traumatic tetanus controlled by it.

According to F. P. Porcher (Southern Fields and Forests) horse

nettle has been used by the negroes as an aphrodisiac, and he further gives a detailed account of several cases of tetanus cured by it. In the form of a syrup it has a local reputation in Georgia as a remedy for cough. According to Dr. Napier, it is a very active diuretic besides being antispasmodic and anodyne.

Recently the *berries* have come into repute as a remedy, and a tincture of the berries and the root as well is made to a considerable extent by pharmacists. About a year ago, I recognized the necessity of a chemical examination, and acquiescing in the previous suggestion of my brother, found as predicted by him that the characteristic constituent was alkaloidal, and obtained it as follows:

*Preparation of Solnine.*—Percolate the root of the plant with alcohol. Distil the alcohol in the presence of enough water to leave one part of residue, in the still after the alcohol is recovered, for every portion of four parts of the drug. Cool the residue, and to it add sulphuric acid in slight excess, and then its bulk of water, and after twenty-four hours filter the supernatant liquid. Evaporate the filtrate to a creamy consistence, make it alkaline with ammonia, and abstract the alkaloid from it by rotations with chloroform. Evaporate the chloroform and abstract the alkaloid from the viscid dark residue by means of dilute sulphuric acid (1 in 50). Filter, make the filtrate alkaline with ammonia, and again abstract by chloroformic rotations. Repeat this operation until the material that is carried forward is soluble in both chloroform and diluted sulphuric acid. It is still of a dark color.

When this point is reached, evaporate the chloroform solution, and when the residue becomes of a viscid condition abstract it with boiling sulphuric ether, U. S. P. 1890. Decant the ether and continue the abstraction of the residue with successive portions of boiling ether until it is exhausted. Evaporate the mixed ethereal solutions, which will yield the alkaloid in yellowish minute crystals.

Purify by solution and crystallization from boiling anhydrous alcohol when the alkaloid will be obtained pure and colorless.<sup>1</sup>

*Properties.*—This alkaloid, to which I have ventured to affix the name *solnine* in order to give it an existence in literature, is in the form of white, brilliant crystals (see *Fig. A*), and is practically insol-

<sup>1</sup> This method is the process of discovery, circuitous as compared with methods that can be evolved now that the alkaloidal character has been established.

uble in water and dilute ammonia. It dissolves freely in all the diluted sour acids forming very soluble salts, that are acrid and bitter, leaving a persistent tingling sensation on the tongue. The salts have not yet been crystallized.

It is very soluble in cold chloroform and in boiling alcohol; from the latter it separates on cooling in large needle-like crystals resembling hydrastine; from the ether by evaporation it remains as a glassy residue. It is precipitated in minute crystals from alcoholic solution by the addition of water. It yields ammonia on heating with caustic potash.

On evaporating the mother liquor spontaneously, no other alkaloidal crystals appeared until it had been reduced to a thin layer, when a crop formed of the general appearance (*Fig. B*). The fact that such an interval of time and alcoholic evaporation separated the two crops of crystals, as well as their general appearances led to the surmise that they might be different substances and of distinct systems.

Prof. Prescott, of Ann Arbor, enlisted the services of Prof. W. H. Pettee, Professor of Mineralogy in the University of Michigan, who kindly determined their faces and angles, reported as follows:

"Solnine crystallizes in the orthorhombic system. The crystals are, as a rule, tabular, or at least thinner than they are wide or long. Some are nearly equal in width and length, others are elongated or rod-like, but in the latter case the rod appears to be flattened, and terminated at the ends by pyramidal faces. The accompanying sketches (tracings in *Plate I*) are not mathematical delineations, but are designed merely to show the variations of different crystals when measured by the goniometer. The crystals were so small that I was unable to measure any of the interfacial angles. They were examined as they lay against the bottom and the sides of the beaker glass, and with the aid of transmitted light. The angles measured were the plane angles between the sides of the polygonal faces as they appeared under the microscope. There was no way of telling what angle the plane of the polygon made with the line of light, and the measurements cannot be regarded as very accurate. A considerable number of different individual crystals were examined, with the view of ascertaining whether the angles so measured would correspond sufficiently well with each other to justify the belief that the several forms seen in the two beakers belonged

to the same crystallographic system and had the same crystallographic contacts. It will be seen that the sides of the long or rod-like crystals *A*, average about the same as those of the shorter form *B*, the difference being simply in the length of the parallel sides."

On reviewing the literature of the subject it is found that in 1890, Mr. G. A. Krauss<sup>1</sup> made a chemical examination, establishing the presence of an alkaloid soluble in ether and petroleum ether, and another that was left in the abstracted drug, and was taken therefrom by alcohol. He accepted that these alkaloids were different, although he obtained so little of the ether soluble alkaloid as to scarcely render a decision positive. The alcohol soluble alkaloid was in his opinion identical with solanine.

In 1891,<sup>2</sup> Mr. Krauss continued the subject by an examination of the leaves of the plant, failing therefrom to obtain an ether soluble alkaloid. However, he obtained an alcohol soluble alkaloid which he also identified as solanine by color reactions.

In the same year<sup>3</sup> Mr. Harry Kahn obtained evidences of an alkaloidal reaction, from this drug by means of the Parsons' scheme of analysis, but did not obtain the alkaloid.

Again Mr. Krauss<sup>4</sup> contributed a paper on the analysis of the berries, obtaining therefrom an alkaloid resembling the specimens previously determined as existing in the leaves and root of the plant. The contributions of Mr. Krauss demonstrate that to his credit should be placed the establishing of the alkaloidal nature of *Solanum Carolinense*. Whether either his or my alkaloid is identical with solanine is perhaps not thoroughly demonstrated, and I prefer until it is obtained in large amount and established positively to allow the name solnine to remain conditionally attached to the substance described in this paper.

Having never made a study of solanine, I am not prepared to decide concerning the identity of solnine and that substance. If Wittstein's description is correct, they are different. He describes solanine as "flat, quadrangular crystals."

Solnine crystals are not flat, although variations in crystalline form within one system is not conclusive evidence.

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<sup>1</sup> Am. Journ. Pharm., 1890, p. 601.

<sup>2</sup> Am. Journ. Pharm., 1891, p. 65.

<sup>3</sup> Am. Journ. Pharm., 1891, p. 126.

<sup>4</sup> Am. Journ. Pharm., 1891, p. 216.

Wittstein says furthermore, Solanine is "not soluble in ether."

Solnine, upon the contrary, was made by abstracting the alkaloid by means of boiling ether.

If Solnine as made by me (I found no other alkaloid) is the alkaloid obtained by Mr. Krauss, it must be his other soluble alkaloid, unless his alcohol soluble alkaloid is also soluble in ether, in which case (Wittstein) it is not Solanine.

As a summary it may be said that my work supports the experimental announcement of Mr. Krauss in that it demonstrates that this plant must be placed with the alkaloid bearing drugs. The figures of the crystals in the frontispiece convey for the first time in print the appearance of crystals of ordinary size. A considerable amount of the alkaloid is now in my possession and will be forwarded to Prof. Trimble for further examination, with a view to establishing its location permanently.

The following are references to the drug:

American Journal of Pharmacy, 1889, 552.

Transactions of Med. Society, S. C., 1889.

Virginia Med. Monthly, Sept., 1889.

American Journal of Pharmacy, 1890, p. 601.

American Journal of Pharmacy, 1891, p. 65.

American Journal of Pharmacy, 1891, p. 126.

American Journal of Pharmacy, 1891, p. 216.

Notes on New Remedies, Sept., 1891.

Chicago Med. Times (Eclectic), 1889, p. 555.

Chicago Med. Times (Eclectic), 1890, p. 8.

Chicago Med. Times (Eclectic), 1891, p. 162.

Eclectic Medical Journal, 1891, p. 554.

Eclectic Medical Journal, Sept., 1893, p. 455.

Eclectic Annual, Vol. I, p. 25.

American Therapist, Dec. 1892. Copied from E. M. J., 1893, 455.

National Dispensatory, 1894, p. 592.

United States Dispensatory, 1894, p. 1744.

## CREOSOTE OR CREASOTE?

BY CHARLES RICE.

Some eighteen months ago the writer was requested by a correspondent, who desired the information for lexicographical purposes, to give an opinion regarding the preferable spelling of the word

"creosote" (or "creasote"). It was then found that the form "creosote" was, for several reasons, the best authenticated, and this was also proposed for, and adopted, in the new U. S. P. Quite recently the writer was requested by another correspondent to produce the reasons why the spelling was altered in the U. S. P., and after he had supplied the information, it was suggested to him that this might be of interest to others. Although the matter is not of much importance, yet, in compliance with the suggestion, the following note is published.

It was Reichenbach who discovered the substance in 1832,<sup>1</sup> and who coined for it the name "kreosot."<sup>2</sup> For this reason alone, therefore, the spelling with "o" should be retained. But as some subsequent writers and authorities thought fit to change the spelling, in English, to "creasote," it is worth while to inquire whether this is in accordance with the best usage in Greek.

In the formation of compound nouns or adjectives in Greek, when a noun forms the first part of the compound, the stem-form of the latter is generally used. Under "stem-form" or "stem" is to be understood that portion of the noun which remains after the termination of the genitive is discarded. (Only general outlines can be given here; for details the reader, who takes an interest in this subject, is referred to Kühner's *Ausführliche Grammatik d. Griechischen Sprache* (2d ed., by Blass), I, 2, 329 sqq.) The stem-form may end either in a vowel or in a consonant. Assuming that a noun of the third declension, the stem of which ends with a vowel, forms the first part of a compound, then this stem may be joined to the second part directly, or else with the intervention of a so-called "binding-vowel," which is usually a short *o*. In some

<sup>1</sup> Schweigger-Seidel's *Journal für Physik und Chemie*, vol. 65 (1832), p. 461.

<sup>2</sup> In vol. 67 (1833) of the before-mentioned journal, Reichenbach himself states why he gave the substance that name: "Hier ist es wo ich nun einmal Gelegenheit zu einem Versuche finde, das Wort *Kreosot*, welches ich für den neuen Körper vorschlage, zu rechtfertigen. Ich leite es nämlich von seiner Eigenschaft ab *das Fleisch zu erhalten*, als einer seiner auffallendsten, eigen-thümlichsten, und von uralten Zeiten her bekannten und erprobten. *κρέας* heisst im Griechischen *Fleisch*, im Gen. *κρέατος*, auch *κρέαω*, [sic! but this should be *κρέαος*], und contrahirt *κρέω*; *σώζω* heisst *ich erhalte, errette*; beides lässt sich sprachgesetzmässig verbinden zu dem Worte *Kerosot* [sic! a misprint for *Kreosot*], welches 'das Fleisch erhaltende, vor Verderben erret-tende' ausdrückt."

cases, the use of the binding vowel is optional; in most others, it is ruled by custom. When the stem ends in a consonant, the binding vowel is necessary. *Examples*: (1) vowel-stem: ἰχθύς, fish, gen. ἰχθύος, stem ἰχθυ; ἰχθυ-βόλος or ἰχθυ-ο-βόλος, fish-catching. (2) consonantic stem: σῶμα, body, gen. σώματος, stem σωματ; σωματ-ο-φύλαξ, body-guard; but, without binding-vowel, σωματ-εμπορία, slave-trade ("body-trade").

Now there are some nouns of the third declension, ending in —ας, which have certain peculiarities. Among these is κρέας, flesh. We shall consider a few others at the same time by way of comparison, viz: γῆρας, old age, and κέρας, horn. Κρέας has in the genitive either κρέως, contracted from κρέα-ος (the α is *short*), or κρέατος. Its stem therefore, is either κρεα or κρεατ. Γῆρας has in the gen. γήρως, contracted from γήρα-ος. A form γήρατος does not occur. Its stem is, therefore, only γηρα. Κέρας has in the gen. either κέρως, contracted from κέρα-ος, or κέρατος. Hence, its stem is either κερα or κερατ.

On examining now the compounds which occur in the actual language, and in which these three nouns form the first part, we find as a rule that, where the short stem (κρεα, γηρα, κερα) is used, the final α (which is *short*) is dropped, and replaced by the binding-vowel ο. Thus we find compounds like the following, in which we will place a hyphen on either side of the binding-vowel:

From κρέας: κρε-ο-βορέω, to eat meat; κρε-ο-δόχος, meat receiving; κρε-ο-πώλης, meat-seller, etc., some 30 compounds actually occurring. In some dialects κρειο is used for κρεο, and κρεω is often spelled for κρεο in manuscripts.

From γῆρας: γηρ-ο-τροφία, γηρ-ο-κόμος, etc., some 10 compounds actually occurring.

From κέρας: κερ-ο-βάτης, κερ-ο-φόρος, etc., some 16 compounds occurring.

There are no compounds having the form γηρα- or κερα-, supported by the best manuscripts. In the case of κρέας, however, the form κρεα occurs in a few (5) compounds with the word νομέω and its synonyms or derivatives (κρεα-νομέω, to distribute (sacrificial) meat, κρεα-δοσία, gift of (sacrificial) meat, etc.) Here, however, the α is *long*, and appears to be contracted from κρεα-ο. These words, are, moreover, old sacrificial technical terms, and do not count in the face of the many other words beginning with κρεο.



Of course, in such words as κρέαγρᾱ, meat-hook, the first part of the word is not κρεᾱ, but κρε, the second word being ᾱγρᾱ. As this begins with a vowel, the binding-vowel *o* is not inserted.

It is curious that, as regards the fuller stems κρεᾱτ (from κρέας, flesh), and κερατ (from κέρας, horn), only the latter appears as first part of a compound. There are no compounds beginning with κρεᾱτ in the actual language, but modern authorities have, quite correctly, employed it in the formation of new words, viz: creat-ic, creat-in, and creat-inin.

From the above it will appear that the form "creosote" is that most in harmony with Greek usage.

The spelling "creasote" appears now only in the British Pharmacopœia, and in various unofficial works of reference, price-lists, etc. All other pharmacopœias spell the word with "o."

## ANALYSIS OF PYCNANTHEMUM LINIFOLIUM, WITH ADDITIONAL NOTES ON P. LANCEOLATUM.

BY HAROLD C. BARKER.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.  
 No. 132.

This analysis was made in the Chemical Laboratory of the Philadelphia College of Pharmacy, at the request of Prof. Henry Trimble, and under his supervision.

A qualitative investigation of *P. linifolium* was made in the year 1876, by Dr. Charles Mohr, whose paper on the subject was published in the Proceedings of the American Pharmaceutical Association, Vol. 24, p. 513.

The plants used in the present analysis, as in the case of *P. lanceolatum*, the analysis of which was published in the February issue of the Journal, were collected in Delaware County, Pa., in the summer of 1893, when in flower, and were cut off a few inches above the ground. The drying was effected without exposure to sunlight or artificial heat, with a loss of about 60 per cent. of the weight.

The estimations were made by the same methods as those employed in the corresponding estimations in the analysis of *P. lanceolatum*, with the exception of the estimation of the ethereal oil, which was made by bringing the benzol extract, previously dried at 100°, to

an approximately constant weight at about  $110^{\circ}$ , the loss being taken as equivalent to the weight of ethereal oil; the amount stated is therefore probably very considerably too low. The results of the estimations may be tabulated as follows:

	Per Cent.		
Moisture, etc., . . . . .			9.13
Ash, . . . . .			5.73
Benzol extract:			
Ethereal oil, . . . . .		.14	
Substance not volatile at $110^{\circ}$ :			
Soluble in hot alcohol, . . . . .	1.59		
Insoluble in hot alcohol, . . . . .	.51	2.10	2.24
Ether extract, . . . . .			1.14
Alcohol extract, . . . . .			1.33
Aqueous extract:			
Mucilage, etc., . . . . .		.68	
Glucose, . . . . .		1.73	
Undetermined, . . . . .		5.71	8.12
Alkaline aqueous extract:			
Albuminoids, etc., precipitated by alcohol,		.91	
Undetermined, . . . . .		2.37	3.28
Acid aqueous extract, . . . . .			.59
Starch, . . . . .			.93
Lignin, etc., removed by chlorine-water, etc., .			26.42
Cellulose, etc., . . . . .			32.44
Loss, . . . . .			8.65
			100.00

The residue left on evaporation of the benzol extract was soft and of an olive-green color. The portion of the non-volatile substance left undissolved by hot alcohol consisted mainly of a dark-green elastic substance, soluble in chloroform; also of some grayish-green matter, probably somewhat soluble in hot alcohol. The portion dissolved by alcohol, on evaporation of the solvent, remained as a dark-green residue. This benzol extract closely resembled the benzol extract of *P. lanceolatum*, but differed in odor.

The ether extract was green. The dried residue was treated with acidified water, and the filtered liquid tested for alkaloids and glucosides, which were not detected.

The dried residue of the alcohol extract was greenish-brown. It was treated with cold water, and the mixture filtered. The filtrate, which was not quite clear, gave the following reactions:

With ferric chloride solution, a dark-green coloration, a dark precipitate afterwards forming. With ferric chloride and ferrous sulphate solutions, mixed, the same coloration as with ferric chloride alone.

With gelatin solution, very little or no precipitate. With lead acetate solution, a greenish-yellow precipitate.

Portions heated with Fehling's solution, and with silver nitrate solution, caused reduction. These reactions agree very closely with those obtained by Dr. Mohr with a substance extracted by him, which he supposed to be a tannin, but which differed from the tannins in giving no precipitate with gelatin. The aqueous and alkaline aqueous extracts were both reddish brown. The ash of the aqueous extract contained a considerable amount of phosphoric acid.

In the acid aqueous extract, calcium oxalate was estimated by precipitating one-tenth by neutralizing with ammonia-water and adding alcohol; this precipitate was incinerated, and the ash being assumed to consist entirely of calcium carbonate, it was calculated to calcium oxalate. The amount of calcium oxalate thus found was equivalent to 1.52 per cent. of the air-dry herb.

After the extraction with acid water, the residue of the plant was boiled with water. One-half of this boiling water extract was acidified with about one per cent. of hydrochloric acid, boiled for about four hours, made alkaline, and the reducing power estimated with Fehling's solution. The result was calculated to starch or inulin, and as a test for starch with iodine solution in a portion of the original extract resulted affirmatively, the quantity is stated as starch. The presence of starch, however, of course, does not prove the absence of inulin. A number of special tests for tannin were made, using portions of the original powdered herb, as follows:

A portion was treated with cold water, a brown extract being obtained, which gave the following reactions:

With ferric chloride solution, mixed solutions of ferric chloride and ferrous sulphate, and with ammonio-ferric sulphate solution, dark green precipitates.

With gelatin solution, no precipitate.

A considerable quantity was extracted with water, and the filtered extract divided into two portions. The first was shaken out with acetic ether, the separated acetic ether solution allowed to evapo-

rate, and the residue, which was quite small, treated with a mixture of one part of alcohol with about three of ether, which left almost nothing undissolved. The residue left on evaporation of this ether-alcohol solution was treated with water, a solution being produced with which the following reactions were obtained:

With a mixture of ferric chloride and ferrous sulphate solutions, a dark-green coloration, the fluid afterwards becoming turbid.

With gelatin solution, no precipitate.

With lead acetate solution, a yellow or greenish-yellow precipitate. The second portion was treated in the same way as the first, except that previous to the agitation with acetic ether a quantity of common salt was added to the fluid, a brown precipitate being thereby produced. The same tests were finally applied as in the first portion, with the same results.

Special tests were also made with a portion of the original powdered herb, for alkaloids and glucosides, which were not detected.

#### ADDITIONAL NOTES ON *P. lanceolatum*.

An aqueous extract of *P. lanceolatum* was shaken out with acetic ether, etc., as described above in the test for tannin in *P. linifolium*. The reactions obtained were as follows:

With mixed ferric chloride and ferrous sulphate solutions, a dark-green coloration.

With gelatin solution, no precipitate.

With lead acetate solution a yellow or greenish-yellow precipitate.

The same substance, therefore, probably occurs in both species.

The detection of starch in *P. linifolium* led to the belief that it could probably be found in *P. lanceolatum*, and a number of tests, both chemical and micro-chemical, were made.

The chemical tests were made in extracts prepared by boiling the material, previously extracted either with cold water or with dilute (about 0.1 per cent.) sodium hydrate solution, followed with water, filtering and cooling; but gave no decisive results; the various extracts when tested with iodine solution gave colorations which were in no case at all blue. The micro-chemical tests were applied to unprepared material and to samples reserved from material prepared as above stated, by extraction with water and dilute soda solution. Bodies were observed, which were almost certainly starch granules, but were quite small and few in number.

In conclusion, the writer desires to correct an error in the tabulated statement of the analysis published in the February number, in the amount stated as inulin, which should be .71 per cent. instead of .35 per cent.

## THE PRESENCE OF LEAD IN CITRATES.

BY F. W. HAUSSMANN.

The fact that the citric acid of commerce is frequently found mixed with particles of metallic lead, derived from the lead-lined tanks in which it is crystallized, is well known.

It is generally accepted as true, that these particles in no way contaminate the acid sufficiently to produce deleterious or decidedly poisonous effects.

This may be the case while the acid is in the dry state, but a different result takes place if an aqueous solution is kept in contact with the lead particles for some time.

It is an ancient observation that the fruit acids in general have a solvent action upon metallic lead, and this fact has been taken advantage of in the course of a number of crude, technical experiments.

Citric acid also shares this property and, although it is doubtful, if its action upon lead is of sufficient extent to produce a toxic dose of a citrate, it must be admitted that a certain amount is dissolved, sufficient to give decided results to the application of reagents for lead in some soluble form.

The U. S. Pharmacopœia recognizes the possible presence of the metal in citric acid, hence a qualitative method for the determination of this impurity is given and the method of application directed would indicate that the solvent action of the acid upon lead and other heavy metals is recognized.

*Solubility of Lead in Citric Acid.*—To determine if citric acid exerted a solvent action upon metallic lead a number of experiments were made.

A portion of the acid, previously ascertained to be entirely free from metallic impurities, was dissolved in cold water and the solution left in contact with fine particles of metallic lead for 3 hours.

After filtration and incomplete neutralization with ammonia water, as directed by the Pharmacopœia, the solution reacted immediately both to ammonium sulphide and potassium chromate.

The same result was obtained if the metallic particles were boiled with a solution of the acid, showing that the metal is acted upon by the acid.

Another source of the presence of lead in citric acid, although not in the metallic state, may possibly be the commercial sulphuric acid used in its preparation from calcium citrate.

The presence of lead sulphate in oil of vitriol is well known.

*The Presence of Lead in Citrates.*—Having occasion to dissolve a large amount of potassium citrate in water, the writer noticed that this salt also deposited particles of the metal.

This was the case in 5 different samples, of which 3 were obtained from the same wholesale firm.

The size of these particles varied, in some instances being the same as those usually found in commercial citric acid, while in others it was found to be finely powdered, at times being scarcely perceptible.

But if the grayish sediment, in which form the metal is found occasionally, was acted upon by nitric acid and reagents subsequently applied, its nature was readily revealed.

The source of the metal was doubtless due to the impure condition of the acid, with omission by the manufacturer to filter the solution after saturation, and before evaporating.

It may also be possible, however, that concentration and granulation of the salt was performed in lead-lined vessels.

The presence of metallic lead in citrates is perhaps of little significance, as long as it remains in this state, but it becomes of graver importance, if, in some manner, it is dissolved and contaminates the salt.

Such is, in many instances, actually the case.

Before the result of the examination of commercial citrates is considered, the action of an aqueous solution of potassium citrate under different conditions upon metallic lead may be inquired into.

To determine this action, the following series of experiments was undertaken.

A solution of the salt was prepared by saturating carefully selected crystals of citric acid, dissolved in distilled water, with potassium bicarbonate. The resulting neutral solution was tested for lead with a negative result.

It was then divided into three parts :

- (1) The above neutral solution.
- (2) Was acidulated with citric acid.
- (3) Was allowed to become alkaline by prolonged contact with potassium bicarbonate.

To each portion particles of metallic lead were added and allowed to remain in contact from 24 to 48 hours.

The solutions were then filtered and examined for lead in the usual manner.

Each revealed the presence of lead, showing that the citrate, either in neutral, acid, or alkaline state, exerted a solvent action upon the metal.

In the preparation of the salt on the large scale several factors may be the means of rendering the lead in commercial citric acid soluble, and each possibility may be considered in turn.

It has already been stated that citric acid alone has a solvent action upon the metal, which is increased by heat.

The neutral salt itself in solution has some solvent power also.

The alkaline condition favors the action upon the metal and this is perhaps the most frequent source of the impurity of the commercial salts.

The Pharmacopœia directs potassium citrate to have a neutral or faintly alkaline reaction.

In the greater number of instances the commercial salt was found to be alkaline, which is probably due to the employment of potassium carbonate in its manufacture.

Still another source may, perhaps, be found in the evolution of  $\text{CO}_2$  during the saturation process.

It is well-known that water saturated with  $\text{CO}_2$  and in contact with lead in its metallic state, is invariably found to contain the metal after a time.

This source is, however, not likely in this case.

*Citrate of Lead.*—The question may be asked, in what form the metal exists in citrates, and the logical conclusion is—as lead citrate.

This salt is stated by most text-books to be insoluble in water.

According to Watts' Dictionary of Chemistry the salt, if prepared by double decomposition between lead nitrate and sodium citrate, crystallizes with 3 molecules of water.

An acid citrate, which is stated to be crystalline and very soluble in water, is also mentioned together with several others.

Lead citrate was prepared by the writer, with a view of determining its solubility in water, by two methods, first by saturating boiling solution of citric acid with the official lead carbonate, and second by the decomposition of lead acetate by a purified solution of potassium citrate.

In the saturation process the lead citrate precipitated as soon as formed, with evolution of  $\text{CO}_2$ .

After cooling, the supernatant liquid was filtered from the precipitate, and on examination gave heavy precipitates with reagents for lead. This would indicate that lead citrate, prepared by saturation, is soluble in water to some extent.

*Precipitated Salt.*—The salt, prepared by precipitation, was carefully washed to remove the potassium acetate.

The washings, even if they were made repeatedly until no sign of the acetate remained, invariably gave indication of the presence of lead.

Subsequent examination of the dry salt showed it to be slightly soluble in water.

The addition of an excess of potassium or any other soluble citrate greatly favors solution of the salt.

If a solution containing lead citrate with an excess of potassium citrate is allowed to stand, the salt will again deposit in a mass of soft crystals after a short time.

This also takes place, if the official solution of magnesium citrate is substituted for the potassium salt.

The same experiments were repeated with the citrate, prepared from lead nitrate in place of the acetate, with identical results.

The statement of the insolubility of lead citrate in water must therefore be accepted as not being invariably the case, especially in the presence of other citrates.

If the lead present in commercial samples of potassium citrate exists in the form of this salt, its ready indication upon the application of reagents to perfectly clear, aqueous solutions is explained.

#### COMMERCIAL CITRATES.

*Potassium Salt.*—The presence of metallic lead has already been mentioned, but it has been found by the writer, that whenever it was present as deposit in an aqueous solution of the salt, the latter also contained the metal in a soluble form.



Citrate of potassium, obtained from four different sources, was examined.

In the 8 samples obtained from one house, 3 showed the presence of metallic lead, while all reacted for lead when examined in solution.

From another source 5 samples were obtained, two of which showed a grayish deposit on solution, three the presence in a soluble form, while two were free from the same.

From a third source two samples were examined, both containing lead in a soluble form.

A fourth source furnished one sample, which was perfectly pure.

It may be seen from this result that the impurity is rather common.

*Lithium Citrate.*—It appears singular, that neither the Pharmacopœia of 1880 or the recently issued 1890 edition recognizes the possibility of the presence of this dangerous contamination, while in the case of lithium citrate complete tests are given for the detection of lead and similar metallic impurities.

Of this salt three samples were examined, two of home, one of foreign manufacture, none of which revealed the presence of lead.

It appears, probably due to the requirements of the Pharmacopœia as to the purity of the salt, that the manufacturers observe greater care in its preparation.

To determine if this citrate also acted upon metallic lead, some particles were left in contact with an aqueous solution of the salt.

The presence of lead in the solution could readily be detected after 3 or 4 hours' standing.

*Other Citrates.*—A sample of ammonium citrate was also examined, which showed lead to be present. As ammonium salts readily attack the metal, the cause of this presence is obvious.

Sodium citrate, not being in frequent use, was not examined.

Of alkaloidal citrates the caffeine salt is the most important.

Several samples of this were examined, all being perfectly free from any metallic impurity.

This comprises the most important citrates of commerce, with the exception of the scaled iron citrates, which were not examined.

*Official Solutions of Citrates.*—The presence of lead is not confined to commercial citrates alone, but official solutions, usually prepared extemporaneously by the pharmacist, are liable to be subject to the

same impurity, if care is not observed in the selection of the acid as well as in their preparation.

Of these the two most important are the solution of potassium citrate, and the popular effervescent solution of magnesium citrate.

*Solution of Potassium Citrate.*—This solution sometimes contains traces of lead, if the acid employed in its preparation is not perfectly pure.

The method of preparation influences its presence to some extent.

If, as directed by the Pharmacopœia, separate solutions of the acid and bicarbonate of potassium are made and subsequently mixed, the finished preparation is usually not affected.

But, as it is sometimes hurriedly prepared, if the acid and bicarbonate are triturated together, the water gradually added, contamination is more likely to take place.

Repeated examination of solutions, prepared in this manner, showed the presence of traces of lead.

Prepared by the official method, very slight or no indications were found.

As this preparation is a much-prescribed diaphoretic and febrile remedy, chiefly employed in diseases of children, care should be observed in the selection of the ingredients.

The possibility of the presence of lead may be advanced as a reason for the more frequent prescribing of the old neutral mixture, which unfortunately has been dropped by the new Pharmacopœia.

*Solution of Magnesium Citrate.*—What has been stated in connection with the previous solution is also the case with this popular preparation.

In some lots of the solution, in which the acid employed contained particles of lead, and prolonged contact took place, it was also detected in the finished solution by reagents.

To determine if the source of the impurity could possibly be derived from elsewhere than the acid, the other ingredients were also examined as to their purity.

The magnesium carbonate answered the pharmacopœial requirements, and the water employed was found to be free from lead.

A number of samples were examined, of which several responded to the hydrogen sulphide test.

Some gave no reaction, showing the absence of the metal.

This preparation, if lead should be present, contains only a trace,

probably insufficient to produce any decided influence upon the human economy.

The possible influence, which such impure preparations, if taken continually, may have upon the system belongs to the domain of medicine rather than pharmacy.

But as the supply is furnished by the pharmacist, the responsibility arising therefrom necessarily rests upon him.

It is therefore his duty to exercise the utmost care in the selection as well as preparation of those articles which are liable to this and similar impurities.

In this he must be aided by the Pharmacopœia, which, by giving the proper directions for the detection, must call attention to their possible presence.

As such is, with but one exception, not the case with citrates, this addition to the present Pharmacopœia may perhaps be suggested.

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## EXAMINATION OF COMMERCIAL PREPARATIONS OF PHOSPHATES OF IRON AND ALKALOIDS.

BY MILTON F. SCHAAK.

Perhaps no class of pharmaceutical preparations has been more widely discussed, and with less satisfactory results than the above.

The object of all this discussion has been to show how to produce preparations of proper strength, palatability, bright color, miscibility, and, above all, to prevent the precipitation of some of the ingredients.

While the pharmacist has despaired of success in some of these requirements, there are nevertheless preparations upon the market that apparently possess all of the desirable physical qualities; and, according to the label, the proper quantity of ingredients.

In order to ascertain by analysis the composition of these commercial preparations, this work was undertaken. In order to make the quantitative determination of important constituents as rapidly as possible, and with sufficient accuracy the following process was devised and followed.

Five to ten grams were taken, diluted with water, heated to expel alcohol, put into a separating funnel, ammonium citrate added (when needed), made alkaline with sodium hydrate and shaken with 3 or

4 successive portions of chloroform until all the alkaloids were removed. The combined chloroform solutions were allowed to evaporate, and the residue dried at 100° C. for one hour, and weighed as total alkaloids.

A portion of this alkaloidal residue indicated quinine by the fluorescence of the acid solution, the thalleioquin reaction, and the formation of a precipitate by ammonia water, soluble in excess.

Strychnine was indicated by moistening a film of the residue with  $\text{H}_2\text{SO}_4$  and adding a minute fragment of potassium dichromate when a fading purple color resulted.

The liquid from which the alkaloids had been removed, after being heated to expel remaining chloroform, was treated with a little ammonium chloride, and ammonium sulphide added in excess, the bottle completely filled, corked and set aside until the supernatant liquid acquired a yellow color without a tinge of green.

The precipitate collected upon a filter and washed with dilute ammonium sulphide, with precautions against oxidation, was dissolved in dilute  $\text{HCl}$ , the solution heated, filtered and thoroughly oxidized with small quantities of nitric acid.

This ferric solution was strongly acidulated with hydrochloric acid and a little copper sulphate and potassium sulphocyanate added.

Decinormal volumetric solution of sodium hyposulphite was now run in until the red color of the liquid was discharged, a little starch paste added and the excess of sodium hyposulphite determined by a corresponding strength solution of iodine.

The iron was calculated from the amount of sodium hyposulphite used.

The phosphoric acid was precipitated as ammonium magnesium phosphate, by adding magnesia mixture to the ammoniacal liquid from which the iron had been removed (the ammonium sulphide not interfering); after the precipitate had thoroughly separated it was washed with ammoniacal water and dissolved in a small quantity of acetic acid and sodium or potassium hydrate added, allowing the solution to remain slightly acid.

After the addition of a few drops of cochineal test solution, heat was applied and volumetric solution of uranium acetate run into the hot liquid, until a small excess of uranium producing a green color with the cochineal indicated the end of the reaction.

The uranium solution having previously been standardized under

similar conditions, the phosphoric anhydride was calculated from the amount used.

Several samples of the scale phosphate of iron, treated according to the above, gave an average of 13.2 per cent. iron and 17 per cent. phosphoric anhydride.

The following table shows the specific gravity and average result of several analyses of each preparation of elixir phosphate of iron, quinine and strychnine; syrup phosphate iron, quinine and strychnine, and several chemical foods.

All the elixirs claimed to contain 2 grains phosphate of iron, 1 grain salt of quinine and  $\frac{1}{100}$  to  $\frac{1}{60}$  grain strychnine.

Number.	Specific Gravity.	Per Cent. Fe.	Per Cent. $P_2O_5$ .	Total Alkaloids.
1	1.17	.39	.52	1.33
2	1.09	.32	.20	.79
3	1.06	.26	.22	.30
4	1.12	.40	.15	1.80
5	1.06	.37	.45	.20
6	1.08	.37	.43	.60
7	1.09	.17	.29	.70
8	1.14	.45	trace	1.35
9	1.08	.36	trace	1.16
10	1.30	.034	3.00	.44
11	1.34	.31	.27	—
12	1.18	.34	.25	—

No. 1, made by the writer, contained 2 grains scale phosphate of iron, 1 grain quinine sulphate and  $\frac{1}{60}$  gr. strychnine to a fluid drachm.

This preparation formed a precipitate when mixed with water, and, on being exposed to light, gradually became darkened in color.

No. 2, a commercial preparation labelled to contain same as above, was of a light greenish color, and clouded slightly on addition of water.

Nos. 3, 4, 5 were of light greenish color and mixed with water without precipitation. No. 4 was stated to contain half the amount of iron as citro-chloride, and the alkaloid quinine.

Nos. 6 and 7 were dark colored, and did not precipitate when mixed with water.

Nos. 8 and 9, made by prominent manufacturers, are considered standard preparations. They did not precipitate on standing, and were miscible with water; 9 was a beautiful elixir of bright green

color and enjoys perhaps a larger sale than any other; it was labelled to contain the full quantities of ingredients.

No. 10 was a syrup, and labelled to contain 1 grain phosphate of iron,  $\frac{1}{4}$  grain muriate of quinine, other phosphate and free phosphoric acid to a fluid drachm.

Nos. 11 and 12 were chemical food or syrup of phosphates, and should contain 1 gr. phosphate of iron to each fluid drachm.

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## POWDERED MEDICINAL EXTRACTS.

BY WILLIAM B. THOMPSON.

Solid extracts of vegetable drugs to be of requisite quality should possess, in a marked degree, the distinguishing characteristics of the material of which they are made. Each should present a distinctive individuality, and in those substances in which the active constituent is alkaloidal, precise assay should show a full average percentage. Odor and taste should be wholly preserved, and that excess of inert matter, usually denominated "extractive" and largely predominating in this class of articles as usually found, should be avoided or materially diminished by skill of process. The choice of a proper solvent or menstruum for the active properties of a drug involves experience and extended observation. Error in, or indifference to, this essential is quite likely to result in a minimum of active constituent loaded with a maximum of "extractive." Both physician and pharmacist will realize that this means a gain in bulk and weight, and thereby a commercial advantage, but the therapeutic purpose and object are lessened to a culpable degree. The initial point, of course, in this, as in all other classes of finished pharmaceutical products, is the selection of good, sound drugs—a quality of which, better than the average, is not too good, and often not good enough. Then the process, in all its detail, of reduction from liquid to solid, should be carried from beginning to full completion, within the vacuum still or vessel, at such controlled or regulated temperature that heat can in nowise prove a destructive element. As complete an exclusion of surrounding atmosphere as is possible precludes that tendency which, it is known, induces a change in the state of single and associated alkaloids, and disturbs that nice adjustment in which these exist in a native or natural condition. With the application of a proper degree

of skill and the scrupulous pains which such important agents as medicinal extracts should always receive at the hands of the manufacturer, it is believed that this class of products can be made to present such unusual features of excellence as are not generally met with in commerce.

Did the conditions of demand and use justify entering upon the preparation aright, of solid extracts, among the other operations of the dispensing pharmacist, and could the necessary apparatus be satisfactorily applied, the character of products would prove quite a revelation in knowledge to the uninitiated—that is to say, that the attainment of complete and perfect products result in a class of preparations so totally unlike what we are accustomed to see as to offer suggestive ideas to the novice and the student. We should be enabled to learn much more than the limited knowledge we now have of the substance known as “vegetable extractive.” Of course, we are aware that those active and potent principles of vegetable substances are intimately associated with and closely involved with the juice, sap and plant composite. But we must acquire a knowledge of how these can be separated from each other without injury to each, and must learn, moreover, that the material from vegetable structure and organism, which yields to the solvent action of liquids, varies greatly under different circumstances in kind, quality and amount of bulk. This clearly points to a need of more knowledge of the character, proportion and quality of menstruum which should be employed. Percolation with warm and cold solvents; the use of that percentage of spirit which would solve neither sugar nor gum, a prolonged action of aqueous menstruum inducing a certain chemical union of starch and tannin; the formation and character of “apotheme” that almost inevitable concomitant of vegetable infusions; the changes of color which occur in the course of evaporation or concentration; existing conditions of atmosphere favorable or unfavorable to drying and powdering—these are a few of the numerous agencies which merit study and attention, and which, if not bestowed at times during the progressive stages of manipulation, will result in unsatisfactory and, it may be, indifferent products.

The specimens here presented in illustration of the statements made show marked peculiarities, and they are each dissimilar, yet are wholly natural products, and may be said to represent advanced

ideas, certainly they do represent good products, and are worthy of close attention. The containers or bottles are purposely large; this is intended to give a mobility to the powders and opposes an existing idea that such substances should be compactly bottled to exclude the air.

PHILADELPHIA, March 20, 1894.

## COLLECTING AND CURING GINGER IN JAMAICA.<sup>1</sup>

BY WILLIAM FAWCETT.

Director of Public Gardens and Plantations.

The Collector of Taxes from Hanover reported that during the year much of the ginger sold realized low prices on account of the imperfect way in which it had been cured.

The Collector-General reported that the average prices realized for ginger in several parishes were as follows:

	Shillings.
Kingston, . . . . .	50-55*
St. Ann's, . . . . .	50
Trelawny, . . . . .	36-44
St. James, . . . . .	52
Hanover, . . . . .	45
Westmoreland, . . . . .	60
St. Elizabeth, . . . . .	30-48
Manchester, . . . . .	16/8-40

\* Shillings per hundredweight.

Information was sought from the Collectors of Taxes as to the reasons for the varying prices, whether proceeding from the difficulties in curing or from some other cause, and also as to the method of curing in different parishes.

It appears from answers with which I was favored, quoted below, that the variation in prices in the different parishes arise generally from causes independent of curing, but that low prices anywhere indicate want of care in curing, or that ratoon ginger is harvested. Further consideration will be given to this subject, and I hope to visit some of the districts when the harvest is being brought in.

<sup>1</sup> The above paper is taken from the Bulletin of the Botanical Department, Jamaica. By a series of letters the information is obtained direct from the source of supply.



HANOVER COLLECTORATE.

"My remarks in my last quarterly report were based on ginger which came under my observation as several lots were sold to the traders here, mildewed, and in one or two cases soft and spongy. I inquired at the time what was the defect in curing which had caused the depreciation in the condition and quality of the ginger, and I was told that ginger, to be successfully cured after it is scraped, must be kept away from the damp or rain, and be subjected every day to exposure to the sun in a dry place, until it is perfectly hard. The ginger mildewed had not received proper attention in this respect, which accounts for the low price which the ginger of this parish brings; and the soft, spongy ginger had not arrived at proper maturity, otherwise green, and had been put away damp into bags. I thought as the matter at various times came within my notice, that this want of proper attention to a valuable commodity was productive of a great loss. In the Seafort Town District I understand that greater care is exercised and as a result much higher prices obtained."

E. P. FULLER.

REVENUE OFFICE, SAV-LA-MAR.

"As far as I have been able to ascertain, the price obtained was due not so much to superior preparation by the producer as to competition on the part of purchasers.

"I am able to state that the mode of preparing ginger in this parish is by scraping and washing and carefully drying it in the sun.

"The low prices given in the early part of the season are for ratoon ginger, which is often reaped before it has attained maturity, and almost immediately mildews for want of constant sunshine which prevails only later in the ginger season."

AUBREY G. FACEY.

INTERNAL REVENUE OFFICE, BLACK RIVER.

"The information I have been able to gather is this: The ginger is scraped and peeled with knives by the growers. The knives are especially imported and known as ginger knives. The ginger is then washed once or twice and turned out to dry on mats, care being taken to provide against mildew.

"I have never heard of ginger being boiled for purposes of curing. I should imagine that such a process would deteriorate its strength, and impair its value to an appreciable extent.

"The difference in price is due to the quality of the ginger as well as to competition. A very superior description is grown at Seafort Town in Westmoreland on the borders of St. James, and owing to a very keen ginger trade done in Montego Bay, where most of this commodity is taken, the Westmoreland traders if desirous to compete, must be prepared to outbid the traders from Montego Bay.

"In the Pisgah Districts of this parish a good quality of ginger is cultivated, which has been known to fetch 54 to 58 shillings in Black River, but the bulk of the ginger brought down to Black River is of an ordinary description, where there is little or no competition, which accounts for the difference in prices between St. Elizabeth and Westmoreland."

S. E. PAYNE.

COLLECTORATE ST. JAMES.

"The process of removing the skins of ginger by means of boiling, is not known in this parish so far as I can gather, and is regarded as one calculated to reduce the spice of the article, and lessen its value as such.

"The mode adopted for removing the skin, is by paring with a sharp, thin, narrow blade knife (properly called scraping); a protracted and tedious job. It is then dried on a paved terrace, boarded platform, or mats made of the stalks of the leaves of the banana or plantain trees, care being taken all the time while drying that the ginger does not get wet, and, at the same time, it is frequently and carefully turned over to avoid mildew.

"I am afraid the price obtained between one parish and another is no criterion of quality, so long as the ginger is not at all passable; all depends on the demand of the trade for the article by the exporting merchant during the particular season, to fulfil an obligation to supply a certain quantity probably, and it therefore must be procured if even at a loss. This principle descends to the smallest shopkeeper, who finds it at times to his advantage to procure as much ginger to be placed to the credit of his account with larger traders with whom he may be dealing, and who in turn may be equally glad to get such a remittance at a given time even in preference to cash.

"I have no doubt that produce is thus procured at prices unwarranted by the ruling market's value abroad, and the small shopkeeper probably discovers for the first time, when he delivers his

purchase, a loss in weight, and likely in monetary value, too, from depreciation in quality, and so on with the next man in his turn."

J. W. GRUBER.

COLLECTORATE MANCHESTER.

"I have very much pleasure in forwarding the information asked for. I have no personal knowledge of the subject, and was altogether dependent on the kindness of George Nash, Esq., who possesses an intimate acquaintance with the subject, and whose letter I now submit."

R. C. J. BACQUE.

[ENCLOSURE.]

"*Ginger*.—There are two descriptions grown here, the yellow and the blue, the yellow being the superior quality. To obtain best ginger it must be planted every year on virgin soil; it is ready for harvesting from March to December in ratoons, and plant-ginger after Christmas up to March and April. The crops grown on the same land after the first year are called ratoons 1st, 2d, 3d, respectively. The gathering is much after the manner of taking in a potato crop, the pieces or stems (from which the ginger is taken) being left in the ground, and moulded up are what form the ratoons which year by year become inferior in quality and is abandoned when it cannot bring more than 16 shillings per 100 pounds.

"Ginger said to be grown in Manchester, the bulk of it comes from over the border of the Parish some miles away in Trelawny, St. Ann and Clarendon. It is purchased in centres there up to 40 to 45 shillings per 100 pounds, according to the fineness in quality (it takes some years to be a competent ginger buyer), the purchaser having to transport same. The best descriptions are brittle, and easily broken, which depreciates its value. Considering its bulk and lightness a heavy item for cartage has to be added. A barrel of the best quality will be many pounds lighter than the inferior; some finds its way to Montego Bay; what comes this way is shipped via Kingston, a distance of over ninety miles from where grown. The distance for transport is not so great in Westmoreland, Sav-la-Mar and other places. This may account for the difference in prices between this and Westmoreland Ginger.

"It may be that the Westmoreland buyer pays too high, or that the grower abandons the ratoons and keeps to the growing of new plant-ginger every year, and so maintains a uniform price, or that the soil is better adapted and yields bolder samples, hence better

results. The writer inclines to the opinion that the difference in prices arises from the difference in road and rail carriage. It may be noted that some of the ginger shipped from the districts stated 'via Manchester,' brings the highest price in the English market, which will go far to prove that the quality can hardly be considered inferior.

*"Preparation of Ginger.*—When taken out of the ground it is washed free from dirt, then experienced hands peel between what are called the toes to avoid their being broken off, as the large branching or bold pieces bring the best price. It is then handed to less experienced hands to peel off the outer portions of the skin. The knife used has a very narrow blade which is riveted into the handle and cannot shut. The blade cannot be too thin and narrow, as it has to cut between the toes which grow very close to each other. When peeling is finished, each piece is thrown into a bowl of clean water, and afterwards thoroughly washed, then put on mats, *i.e.*, stands are made of crutch-sticks driven into the ground and of even height; strengthening pieces go in parallel lines. Mats made of thatched palm are then spread, and drying commences. The ginger must not get wet when once it begins to dry, and is then taken in every evening. Some parties use lime-juice in washing, with a view to make the ginger white, and ensure a better price. It is invariably found when so treated that it mildews, thus injuring and considerably reducing the value. No ginger is as that which is washed in pure, clean water properly, and thoroughly dried.

*"Curing with Boiling Water.*—I am glad to say that it is not resorted to on this side as far as I am aware.

"In view of the constant demand for virgin soil for the production of fine ginger, its exhausting effects on the soil, the wholesale destruction of valuable timber in forest lands fire being the only agent for cleaning up for planting, one can only realize by a visit to the district the alarming destruction from year to year going on, the drying up of streams, the tens of thousands of pounds of valuable timber lost in smoke, the now varying rainfall, the soil becoming so impoverished that only ferns will grow on it afterwards, with other attendant evils. The conclusion arrived at is, the sooner the production of ginger is abandoned the better. A howling wilderness of barrenness marks its progress in every direction, and £20. worth of ginger is the outcome of ten times twenty pounds of destruction."

GEO. NASH.

✓ AN ANALYSIS OF SANGUINARIA SEED.

BY JOHN CULLEY.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.

No. 133.

The rhizome of *Sanguinaria Canadensis* has long been used as a medicinal agent and as a source of the alkaloid sanguinarine, but very little, if any attention, has been given to the seed for such purposes.

Sanguinaria seed is quite plentiful during certain seasons of the year, and a quantity was collected and subjected to an analysis with a view of ascertaining if the same active principles existing in the rhizome also exist in the seed. And, if so, do they exist in such quantities that the seed could in any way replace the rhizome, both in medicine and as a source of sanguinarine.

Fifty grams of the seed were crushed and thoroughly exhausted with petroleum ether; the ether recovered and the residue yielded 14.097 gms. of a pale yellow, oily fluid, consisting chiefly of fixed oil. This oil was partly soluble in 95 per cent. alcohol; absolute alcohol dissolved a portion of the residue and the remainder was totally soluble in ether.

A small portion of the oil was shaken with acidulated water, the aqueous liquid separated, and gave affirmative results with reagents for alkaloids.

The remainder of the oil was then thoroughly shaken with several portions of water, acidulated with hydrochloric acid, the aqueous solution assuming a bright scarlet red color.

The oil was now of the same color, and repeated treatment with acidulated water failed to entirely remove the coloring principle, showing that some of the alkaloid combined with hydrochloric acid, was still in solution in the oil.

The acid solution obtained was rendered alkaline with sodium hydrate, the liquid then becoming colorless, and the alkaloids removed by shaking with several portions of ether and finally with chloroform.

These extracts, evaporated spontaneously, yielded in each case a varnish-like substance, which was taken up with water containing a few drops of sulphuric acid, when the solution again resumed the red color.

This solution gave a red-brown precipitate with gold chloride solution, one of the characteristic reactions of sanguinarine.

The drug was next treated with stronger ether, and yielded 2.2375 gms. of a dark, reddish-brown, thick extract. This was shaken with water containing one per cent. of hydrochloric acid, which formed a scarlet red-colored solution, and a residue of the same color.

This acid solution was then rendered alkaline and shaken with a mixture of ether and chloroform. The ethereal solution thus obtained was spontaneously evaporated, the resulting amorphous residue taken up with diluted sulphuric acid, again resumed the red color, and reacted affirmatively with various reagents for alkaloids.

The red residue remaining after the above treatment, was allowed to stand for twenty-four hours in contact with 95 per cent. alcohol. The liquid separated and the residue treated in like manner with absolute alcohol.

By this treatment all the color was removed from the remaining resin.

These alcoholic liquids were mixed and evaporated spontaneously. The residue was taken up with very dilute hydrochloric acid, and filtered. There separated a resinous mass with a small portion of the coloring principle still adhering.

This acid solution, rendered alkaline, shaken out with ether and chloroform and evaporated, yielded a light brown varnish-like substance, similar to that obtained in the petroleum ether extract.

From the above treatment it was found that the alkaloids would not crystallize from an ethereal solution, so the solid mass was dissolved in absolute alcohol, filtered and spontaneously evaporated, yielding a few small crystals.

The very small quantity of crystalline alkaloid obtained was not sufficient to carry on any further experiments, so a special assay for alkaloids was made from twenty-five grams of the seed. The crushed seed was macerated for twenty-four hours in one hundred cubic centimeters of modified Prollius fluid, at the end of which time the liquid was separated and the residue well washed with the same fluid.

This extract was evaporated to nearly constant weight, and shaken with a mixture of sulphuric acid and water until the shakings gave no reaction for alkaloids.

The acid solution rendered alkaline, the alkaloids removed by shaking with a mixture of ether and chloroform, and evaporated in a tared beaker, yielded .025 gms. of alkaloid in the form of a varnish, equivalent to one-tenth per cent.

The mass was thoroughly mixed with water, and acetic acid added until a solution was effected.

This solution was subjected to the following tests which are very characteristic of sanguinarine. The solution was of a bright-red color. With tartar emetic, silver nitrate, mercurous nitrate, mercuric chloride and ferric chloride, it yielded a yellow precipitate in each case. Gold chloride gave a dark red-brown precipitate, potassium chromate, a yellow and iodine a crimson precipitate.

No reaction with tannic acid or basic acetate of lead.

The original drug after treating with ether was macerated with absolute alcohol, yielding 1.468 gms. of extract.

This was treated with fifty cubic centimeters of warm water, filtered, the precipitate taken up with a weak solution of hydrochloric acid, gave the red color of sanguinarine salts and responded to tests for alkaloids. A small portion of the filtrate from the above gave no reactions for tannic or gallic acids.

Another portion made acid, did not produce the red color, nor react with Mayer's reagent or gold chloride.

The alkaloidal reactions from this extract were very faint, although the alkaloid is very soluble in absolute alcohol. Their absence at this point was due to the fixed oil, extracted by petroleum ether, being a perfect solvent for them.

The residue was next dried and extracted with distilled water, yielding 1.86 gms. of extract, consisting of .3996 gms. glucose, .147 gms. sugar, .345 gms. mucilage, .360 gms. dextrine and undetermined.

The sodium hydrate treatment yielded 4.987 gms. of extract, of which 2.856 gms. were pectin and albumen.

From the hydrochloric acid macerations, 2.68 gms. of extract were obtained, 1.45 gms. of which was calcium oxalate and pararabin.

The drug was next boiled with distilled water, yielding an extract which gave a red-brown reaction with solution of iodine, showing the absence of starch. The amount of extract obtained was .830 gms.

The remaining portion of the drug, after having been washed,

dried and weighed, was treated with chlorine water, removing .283 gms. of lignin.

The residue was cellulose.

## SUMMARY OF PRECEDING WORK.

	Per Cent.
Moisture, . . . . .	6.400
Ash, . . . . .	2.600
Extracted by Petroleum Ether, . . . . .	28.196
Fixed Oil.	
Alkaloids.	
Extracted by Stronger Ether, . . . . .	4.474
Resin and Alkaloids.	
Extracted by Absolute Alcohol, . . . . .	2.936
Resin.	
Extracted by Distilled Water, . . . . .	3.720
Glucose, . . . . .	.7992
Sugar, . . . . .	.294
Mucilage, . . . . .	.6912
Dextrine, . . . . .	.720
Undetermined, . . . . .	1.2156
Extracted by Sodium Hydrate, . . . . .	9.974
Pectin and Albumen, . . . . .	2.856
Undetermined, . . . . .	7.118
Extracted by Hydrochloric Acid, . . . . .	5.360
Calcium Oxalate and Pararabin, . . . . .	1.45
Undetermined, . . . . .	3.91
Extracted by Boiling Water, . . . . .	1.660
Extracted by Chlorine Water, . . . . .	.566
Lignin.	
Residue, . . . . .	32.584
Cellulose.	
Loss, . . . . .	1.530
	<hr/> 100.000

DETECTION OF SALICYLIC ACID IN FOOD.<sup>1</sup>

BY K. P. McELROY.

Salicylic acid has been known for more than half a century, having been discovered in 1838 by Piria in oxidizing the oil of meadow sweet (*Spiræa ulmaria*). But its commercial importance dates back only to 1874 when Kolbe succeeded in making a synthesis of it from sodium phenolate and carbonic acid. In 1860, in conjunction with Lautemann, he devised another synthetic process, but

<sup>1</sup> Jour. Am. Chem. Soc., 16, p. 198.



as this method involved the use of metallic sodium the product was expensive.

After securing the entire success of his second process in 1874, Kolbe turned his attention to finding uses for his product. In that and the succeeding year he published a number of papers on its use as a food preservative, as did several of his pupils and assistants, etc. Public attention became attracted to the acid, and its use as a preservative spread with great rapidity. In 1877 the French Government found itself obliged to take official action regarding the use in wine of salicylic acid.

Analytical chemists of course were not slow to recognize the new demand on their skill involved by the use of this substance as an addition to food, and methods for its detection were soon elaborated. The number of these methods has yearly increased, and at present a fair sized bibliography of analytical literature relative to salicylic acid might be compiled.

The most useful properties of salicylic acid, analytically speaking, are that it is volatile with steam; that it is extracted from acid liquids by ether, chloroform, carbon bisulphide or benzol; that it gives a bright purple color with ferric chloride, a green color with copper acetate, and a rose color when boiled with Millon's solution, and that when converted into the methyl ester it gives rise to a characteristic odor of wintergreen. The iron test is the one which is universally used for the final recognition of this substance, the previous separation from the food being made either with one of the solvents above named or by distillation. It is extremely delicate, giving a good reaction with a tenth milligram in twenty-five cc. of liquid. The copper test is not particularly delicate, nor is the methyl ester test, at least as far as I am concerned. This latter test has been brought forward particularly by Dr. Curtman, of St. Louis. The test with Millon's solution is given by other substances extractable from foods by ether. The iron test is not given by any substance occurring in foods and extracted by ether to my knowledge. Carbolic acid gives the reaction nearest approaching it in color of the common substances, but this substance does not occur in food. Tannic acid, a little of which is sometimes taken up by ether from wines, gives a blackish or greenish color which has a tendency to hide the salicylic color.

In the laboratory of the Department of Agriculture the method

which has been most commonly used involves the separation of the salicylic acid by distillation with water vapor. The use of distillation for this purpose, separating salicylic acid from food, I believe was first proposed in an unsigned article appearing in the *Chemiker Zeitung*, in 1882, presumably from the pen of the editor, G. Krause. It was there stated that the method had been elaborated in the laboratory of that paper. Kolbe used distillation for the analytical separation of salicylic acid in 1880. In using it in this laboratory on the samples of canned vegetables, the analyses of which are recorded in *Bulletin* 13, part 8, of the Division of Chemistry, United States Department of Agriculture, the contents of the can were pulped in a mortar, water added, together with a little phosphoric acid, the mixture strained through a bag, and the liquid subjected to distillation. The distillate was then collected in small portions, and each portion separately tested with iron chloride. Mr. W. D. Bigelow, who was associated with me in the analyses of these goods, and who made the greater portion of the tests, found the best strength of ferric chloride to be about five mgms. to the cc. The salicylic acid has a tendency to accumulate in the later portions of the distillate, and where the amount present is small, there will be hardly any test given by the first fractions. In illustration of this the following experiment may be adduced. Twenty-five milligrams of the salicylic acid were dissolved in 250 cc. of water containing a little phosphoric acid and the mixture subjected to distillation, the distillate being collected in twenty-five cc. portions and the salicylic acid estimated colorimetrically. The results may be tabulated as follows:

No.	Cc.	Reaction.	Quantity Found.
1	25	Distinct but pale, . . . . .	
2	25	Somewhat stronger, . . . . .	
3	25	Still stronger, . . . . .	0.3 mgm.
4	25	" " . . . . .	0.4 "
5	25	Bright, . . . . .	0.5 "
6	25	" . . . . .	0.8 "
7	25	" . . . . .	0.9 "
8	25	" . . . . .	2.2 mgms.
9	15	" . . . . .	3.0 "
Total, . . . . .			8.1 mgms.

I will quote in further illustration of this tendency the method for the determination of salicylic acid in wine described by M. Ince. In this method 210 cc. of wine are mixed with ten cc. of dilute sul-

phuric acid and the mixture subjected to distillation, the distillate being collected in fifty cc. portions. The first portion is thrown away and the acid estimated in the next two colorimetrically. The quantity found is multiplied by eight, it being assumed that one-eighth of the total salicylic acid will come over in those two fractions when using the amounts of liquid specified.

All the samples of canned vegetables were examined in this way, using the fresh contents of the cans. Afterwards, for various reasons, I had the whole series gone over again and the extraction done in a different fashion. The residual contents of the cans had in the meantime been dried and ground to a powder capable of going through a hundred mesh sieve. Portions of this powder were made into a paste, or rather a very stiff dough, with dilute sulphuric acid, and the product placed in an ordinary ether extraction apparatus where it was extracted with ether for several hours. When the ether extract was evaporated to dryness, and the residue taken up with water and distilled, the distillate gave the salicylic acid reaction with much greater brilliancy than had the original test, and many samples were found to contain the acid which had before given only doubtful tests or none at all in some cases. The cause of this difference was no doubt the imperfect extraction in the first method of separation, which practically gave only the salicylic acid present in the juice, while the latter method gave that existing in the solid portions as well. Many reactions were quite faint, so much so as to raise the question of the purpose of the addition of such minute quantities of salicylic acid. The smallness of these quantities was probably due, however, to a cause first pointed out by Kolbe in 1880. Kolbe found that salicylic acid completely disappeared from wine and from water preserved in casks, while in similar samples preserved in glass this disappearance did not take place. Four months' standing, in some cases, were sufficient to cause this disappearance. As an experiment, he placed thoroughly washed cubes of different woods in glass flasks in contact with different solutions of salicylic acid and found that they caused a complete disappearance of the acid after various periods of time, while control samples in which no wood was placed retained their full content of salicylic acid. From the results of this work he drew the inference that woody tissue not only removed the salicylic acid from solution but caused its total destruction in some way, since he could not recover it from the cubes of woods used in

the experiments just cited. The woody tissue of the canned vegetables may have caused an action similar to this.

We also use the ordinary "shaking out" method in the Department laboratory to some extent for such goods as beers and wines. The beer or wine is extracted with about half its volume of ether and the extract evaporated to dryness, and the residue taken up with warm water. The resultant solution is tested in the usual way with iron chloride. Between the two processes of separating the salicylic acid, distillation or shaking out with ether, I do not believe there is much choice, though the former is cheaper and more expeditious. The increased purity and sharpness of the reaction given by the distillate as compared with that given by the residue from the ether extract about counterbalance the fact that only a fraction of the salicylic acid appears in the distillate. Objections against the distillation process were raised in 1889 by certain Dutch chemists, on the ground that in the process of fermentation certain "phenol-like bodies" were sometimes formed which interfered with the reaction. "Phenol-like bodies" would interfere not only with the distillation separation but with any other with which I am acquainted, since phenol is taken up by immiscible solvents from acid solutions precisely as is salicylic acid.

This year three chemists, writing for different German brewing papers, have claimed that in what is called "color" or "caramel" malt a substance exists which gives all the ordinary salicylic acid reactions. The substance is said to exist in many malt extracts rich in isomaltose. J. Brand isolated the substance from color malt and describes all its reactions as being analogous to those of salicylic acid, with the single exception of that with Millon's reagent with which the new substance gave no reaction. I procured a set of color and caramel malts from the World's Fair and tried to obtain a salicylic acid reaction from them, but could not do so. At my request Mr. Bigelow, who not long ago examined a large number of the beers exhibited at the World's Fair, tried a large number of them with Millon's reagent, using it side by side with the iron solution. He reported to me that the Millon's reagent gave salicylic acid in all the samples, irrespective of the reaction upon the ferric chloride. The latter gave salicylic acid in comparatively few. It is only just to say, however, that where ferric chloride indicated the presence of salicylic acid, the reaction given by Millon's reagent was much brighter than where this was not the case.

## GLEANINGS FROM THE GERMAN JOURNALS.

BY FRANK X. MOERK, PH.G.

*Jalap resin* has repeatedly been investigated, but considerable discrepancy existing between the results, A. Kromer, who has made studies of the glucoside constituent of several plants of the same natural order, approached the subject. Convolvulin was prepared from authentic jalap resin by first removing water soluble constituents; after drying at a moderate temperature it was treated with several portions of ether to remove fats and other soluble matter; the brown residue, insoluble in ether, was dissolved in alcohol and subacetate of lead solution added until precipitation ceased; the supernatant liquid and precipitate was transferred to a filter, the precipitate washed with alcohol until the washings ceased to produce a turbidity when dropped into water, and the excess of lead precipitated with  $H_2S$ , the precipitate being washed with alcohol. The alcohol was in large part recovered from the filtrate and washings, the residual convolvulin was purified by repeated solution in alcohol and precipitation with ether; it formed a colorless amorphous mass, reducible to a white powder, which, during the operation, became strongly electrified; easily soluble in alcohol and glacial acetic acid, insoluble in petroleum ether and ether; concentrated sulphuric acid colors it red or brownish red. Convolvulin is lævogyre, and has the formula  $C_{61}H_{108}O_{27}$ , which is deduced from its analysis and its decomposition products; alkalis decompose it into one molecule volatile methyl-ethyl-acetic acid  $C_5H_{10}O_2$ , and two molecules monobasic convolvulinic acid  $C_{28}H_{52}O_{14}$ , which is amorphous, yielding a white, hygroscopic powder soluble in water and alcohol, insoluble in ether; strong  $H_2SO_4$  colors it red or brown-red; by the action of acids one molecule convolvulinic acid yields two molecules of a glucose and one molecule convolvulinolic acid  $C_{16}H_{30}O_3$ , which is insoluble in water, melts at  $46^\circ C.$ , is not colored by  $H_2SO_4$ , and is isomeric with jalapinic acid and scammonolic acid, both of which melt at  $63-64^\circ C.$

Convolvulin in its decomposition by KOH unites with 13.7 per cent. KOH. This determination may prove of considerable value as a rapid means of determining the purity of the convolvulaceæ resins, and is performed as follows: The convolvulin or resin is dissolved in an excess of  $\frac{1}{5}n$  potassium hydrate, allowed to stand twenty-four hours and titrated with  $\frac{1}{5}n$  sulphuric acid, using litmus as the indicator.

Convolvulin is slowly decomposed by mineral acids, yielding a glucose, methyl-ethyl-acetic acid, and convolvulinolic acid. Convolvulinol, one of the decomposition products obtained by Mayer in the hydrolysis of convolvulinic acid could not be isolated. It is considered to have been impure convolvulinic acid.—Pharm. Ztsch. f. Russl., 1894, Nos. 1-7.

*Manufacture of Phosphorus.*—By heating sodium or calcium metaphosphate with aluminum, phosphorus is obtained to the extent of 28-31 per cent. of the theoretical yield; the residue, which contains some aluminum phosphide a gray crystalline powder of the formula  $Al_3P_5$ , by heating with silica liberates an additional quantity of phosphorus, so that by taking proper proportions of the metaphosphate, aluminum and silica, almost the full theoretical quantity of phosphorus is obtainable. Attempts to liberate phosphorus from the ignited superphosphate mixture (obtained from bone-ash and sulphuric acid) by heating it with aluminum and silica always resulted in explosions; these were always the result of heating a sulphate, like that of barium or calcium, with aluminum and silica; the chlorides of these metals are also decomposed by aluminum and silica, although not so violently as in the case of the sulphates.—A. Rossel and L. Frank (Berichte), Chemisches Repert., 1894, 38.

*Formalin*, an aqueous solution of formaldehyde (Am. Jour. Pharm., 1893, 286), was noticed to have remarkable deodorizing power upon decaying organic substances. Experiments made with malodorous substances gave interesting results: Hydrogen sulphide solution with a sufficient quantity of formalin develops after a short time an odor resembling that of the onion; the mercaptans or sulphur alcohols react slowly with formalin giving rise to a faint onion odor; ammonia, and amines at once unite to form odorless compounds; skatol does not unite or react with formalin, unless acids be present; fæces are at once deodorized by formalin, so that the substances, like methyl-mercaptan and skatol, which are considered to cause the odor, either do not cause it, or else these substances artificially made are not identical with those present in the fæces.—Dr. Schmidt, Pharm. Ztg., 1894, 55.

*The assay of extract of conium*, owing to the volatility of its alkaloid, presents difficulties not met with in the assay of other extracts; G. Liljenström, in taking up this subject, ascertained that no matter

how long (from 2 to 6 hours) the continuous extraction with ether of a mixture containing known quantities of conine was continued the total quantity of alkaloid could never be obtained. The explanation given is that the alkaloid being volatile is carried along with the ether and travels continuously from the receiving flask to the percolator and back again; by placing in the receiving flask an excess of  $\frac{n}{100}$  acid and then continuously extracting with ether; the entire amount of conine taken for the experiment could be recovered by an extraction lasting only fifteen to thirty minutes; the excess of acid is afterwards titrated with  $\frac{n}{100}$  alkali, and from the difference the amount of conine is calculated. This method appears to be the only one yielding reliable results, since in the methods of extracting the alkaloids from alkaline solutions with solvents and evaporating the solvents, no matter how carefully the latter operation is conducted, some of the alkaloid is lost by evaporation.—Pharm. Ztg., 1894, 57,

*Extractum quebracho*.—Kremel calls attention to the act that there appears in the Austrian market an extract bearing the above name, which is made from another bark *Loxopterygium Lorentzii*, also known as the bark of "quebracho colorado," the true quebracho being known as "quebracho blanco." To this similarity in names is attributed the above substitution; the true extract, owing to its alkaloidal constituent, gives with tannin a precipitate, the extract of quebracho colorado does not contain an alkaloid, hence, will not react with tannin; on the contrary, owing to the tannin which it contains will cause a precipitate when added to a solution of the true extract.—(Oesterr. Ztschr. f. Pharm.) Pharm. Ztg., 1894, 91.

*Liquor ammonii ergotini*, a solution of which one cc. represents three grams of ergot or three decigrams of ammonium ergotate, is claimed to be a solution of the salts of a decomposition product of ergot, which while retaining the full activity of the drug is more permanent and reliable than the preparation made directly from the drug; the dose is 15 to 20 drops; for subcutaneous injection the charge of a Pavraz syringe.—Dr. A. Voswinkel, Pharm. Ztg., 1894, 100.

*Pyrotoxina bacterica*, the fever poison produced by bacteria in infectious fevers, is isolated from cultures in liquid, non-peptonic, nourishing media; the process of isolation is based upon the follow-

ing properties: it is not decomposed by boiling, can be dialysed, is soluble in water, glycerin and dilute alcohol, but insoluble in absolute alcohol or of alcohol of greater than 90 per cent. strength. It forms a deliquescent, white, friable, amorphous mass; is not decomposed by prolonged contact with alcohol; it is not soluble in chloroform or ether; it is not an albuminoid, but has reactions differing from the other known products of bacteria.—Dr. E. Cantanin (*D. Med. Wochenschr.*), *Pharm. Ztg.*, 1894, 136.

*Alkaloidal Assaying: Ipecac.*—The method described in *Am. Journ. Pharm.*, 1893, 82, has, through an extended application, been improved, chiefly by using a modified mixed solvent and is now offered in two forms: (1) 12 gm. powdered ipecac are deprived of fat with ether and transferred to a tared vial of 200 cc. capacity by the method described under the assay of *Nux Vomica* (*Am. Journ. Pharm.*, 1894, 42), the weight of the ether made up to 90 gms. and 30 gm. chloroform added; after 5 minutes 10 cc. water of ammonia (10 per cent.) are added, the mixture thoroughly shaken during one-half hour, 10 cc. water added and again agitated for two or three minutes; 100 gms. of the clear liquid are decanted, the solvent distilled off, the residue taken up twice with small quantities of ether (to remove the last portions of chloroform), heated for 15 minutes in a water-bath at 100° C., weighed and titrated.

(2) 12 gm. powdered ipecac are placed in a vial of 200 cc. capacity, agitated frequently during 5 minutes with 90 gm. ether and 30 gm. chloroform, after adding 10 cc. water of ammonia and allowing to stand for one-half hour, 10 cc water are added, and 100 gm. of the clear solution transferred to a separating funnel where it is agitated with three portions of 25, 15 and 10 cc. of one per cent. hydrochloric acid; the acid solutions are next transferred to the separating funnel, made alkaline with ammonia and extracted with two portions of 50 gm. each of a mixture of chloroform three parts and ether two parts; the alkaloid solutions are filtered through an ether-wetted filter into a tared flask, the solvent recovered (the last traces of chloroform removed as above) the residue dried, weighed and then titrated as in the original publication. The difference (0.006–0.13 per cent.) between the weight of the alkaloid and the amount ascertained by the titration is much less than in the original method (0.055–0.335 per cent.) To determine to what extent emetine is present in the woody portion of ipecac root, best grades of dry Rio



and Carthagena root were selected and the bark and wood carefully separated and used for the assays. Rio : bark 2.908 per cent., wood 0.533 per cent. Carthagena : bark 2.92 per cent., wood 0.65 per cent. In the examination of the woody portion if the results are much higher than 0.5–0.6 per cent., it would indicate that the root had become wetted. These figures for the wood while higher than those generally quoted, still warrant the requirement that in providing the root the woody tissue be removed as far as practical.

*Hydrastis*.—Hydrastine being the active constituent only this is considered in the assay which is based upon the same principles as that of the assay of ipecac. (1) Powdered hydrastis 12 gm., ether 120 gm., water of ammonia 10 gm., water 15 gm., 100 gms. (representing 10 gms. root), are to be decanted, the solvent removed and the residue weighed. (2) Powdered hydrastis 25 gm., ether 125 gm., water of ammonia 10 gm., water 30 gm.; 100 gm. decanted (20 gm. root), extracted with dilute hydrochloric acid, etc., as described under method (2) for ipecac assay, the yield of crude alkaloids is 2.63–2.97 per cent. As hydrastine cannot be titrated, the crude alkaloid is dissolved by the aid of heat in 8 cc. alcohol, 4 cc. ether and then gradually 20 cc. water added; after standing for 24 hours almost the entire quantity of hydrastine will have crystallized out, so that the crystals can be removed to a filter, washed with about 6 cc. cold water, transferred back to the flask, dried and weighed. Berberine can be extracted from the drug, previously extracted with ether, by the use of alcohol and precipitating as nitrate or tri-iodide.

*Cevadilla*.—Powdered Cevadilla seeds 15 gm., ether 150 gm., water of ammonia 10 gm., water 30 gm.; 100 gm. (10 gm. drug) are decanted, agitated with dilute hydrochloric acid, etc., as above using ether as the solvent of the alkaloids. The yield of crude alkaloids is 4.25–4.35 per cent. compared with 1.2 per cent. of other investigators. The crude alkaloid represents a mixture of veratrine and veratridine ( $C_{32}H_{49}NO_9$ , mol. weight 591), sabadilline ( $C_{41}H_{66}N_2O_{13} = 764$ ), sabatrine ( $C_{20}H_{45}NO_9 = 516$ ) and a few other alkaloids occurring only in minute quantity, which can easily be titrated. From experiments the purified alkaloid has an equivalent weight of 620–630, so that one cc.  $\frac{n}{10}$  hydrochloric acid represents 0.0625 alkaloid.—C. C. Keller (Schwz. Wochenschr. f. Chem u. Pharm.) Apotheker Ztg., 1894, 52 and 133.

MINUTES OF THE ANNUAL MEETING OF THE  
COLLEGE.

The annual meeting of the members of the College was held March 26, at 4 o'clock, P.M., Charles Bullock presiding, twenty-two members being present. The minutes of the last stated meeting (December, 1893) and of the special meeting of February 16, 1894, were read and adopted. The minutes of the Board of Trustees for January, February and March were read and adopted. Reports of Committees and Officers being in order, the Committee on Publication submitted the following synopsis: Reference is made to the fact that the Committee have remained an unbroken unit for twenty years, and until the death of Professor Maisch no change had occurred. That during the greater portion of this time, the publication of the Journal afforded a satisfactory margin of profit, and in addition to subscribers the publication has been furnished free of charge to every member in good standing and to all the exchanges. During the protracted illness of Professor Maisch, his son, H. C. C. Maisch, assisted by a member of the family, performed the editorial work in a very satisfactory manner. Owing, therefore, to circumstances, the Committee have no detailed report to present.

The Treasurer of Publication Committee and the Business Editor presented financial statements, as usual.

The Librarian reported a total expenditure for the year for new books and binding of \$320.05, and stated that 16 volumes had been presented to the College Library, also 10 Consular Reports, 7 Reports of Smithsonian Institute, miscellaneous 20.

The Curator stated that since the last report, and during the year past, a number of valuable acquisitions had been made to the museum collection, but called particular attention to the fact that Professor Maisch's personal collection of more than 3,000 specimens had been devised to the College.

The Secretary read a letter of acknowledgment from Baron Von Mueller, Government Botanist, in Her Majesty's Service, at Melbourne, having complimentary reference to his election as an honorary member of the College.

This occasion being that of the annual election of officers, nominations having been made, and tellers duly appointed, ballots were taken and the result as follows announced:

For President—Charles Bullock.

" First Vice-President—Robert Shoemaker.

" Second Vice-President—William J. Jenks.

" Treasurer—James T. Shinn.

" Corresponding Secretary—Dr. A. W. Miller.

" Recording Secretary—William B. Thompson.

" Librarian—Thomas S. Wiegand.

" Curator—Jos. W. England.

" Editor—Prof. Henry Trimble.

" Trustees for three years—Wallace Procter, Gustavus Pile, W. Nelson Stem.

" Trustee for unexpired term—Prof. Edson S. Bastin.

For Committee on Publication—Wallace Procter, Henry N. Rittenhouse, Samuel P. Sadtler, Jos. W. England.

“ Delegates to Pennsylvania Pharmaceutical Association—Alonzo Robbins, Dr. C. B. Lowe, Jos. P. Remington.

Meeting on motion adjourned.

WILLIAM B. THOMPSON,  
*Secretary.*

## MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, March 27, 1894.

The meeting was called to order, and on motion of Prof. Trimble, Dr. C. B. Lowe was called to preside.

The minutes of the last meeting were read, and no corrections being required were ordered to stand approved.

The registrar reported that a copy of the National Dispensatory, and also one of the United States Dispensatory had been received, the former from the publisher and the latter from Professor Remington. A work by Prof. F. A. Flückiger, “Reactions,” was presented by Hans M. Wilder; also two numbers of the Consular Reports.

The first paper announced, on Lead in Citrates, by F. W. Haussmann, Ph.G., was read and listened to with much attention. It showed that although lead was a common impurity in citric acid of commerce it was rarely so to any injurious extent, and explained the various ways in which the contamination most likely occurred.

Prof. Trimble suggested that a similar investigation of tartaric acid would make an excellent subject for a paper for a future meeting.

The next paper was one on Examination of Commercial Preparations of Phosphates of Iron and Alkaloids, by M. F. Schaak, Ph.G., the object being to show the care necessary to be taken to secure the various components of elixirs in the required proportions. The reading of this paper occasioned considerable discussion, and the reactions that occur were commented upon.

Mr. John Culley read a paper upon the seeds of *Sanguinaria canadensis*, with an analysis of the same.

Mr. Harold C. Barker read a paper upon *Pycnanthemum linifolium*. It traced the history of the plant, the first examination recorded being that of Dr. Ch. Mohr.

Prof. Trimble read a paper by Prof. J. U. Lloyd, upon Solanine, an alkaloid from *Solanum Carolinense*. He exhibited crystals of the alkaloid to be deposited in the College Museum.

Mr. Wm. B. Thompson read a paper upon powdered vegetable extracts. The paper was accompanied with samples of several extracts in powdered form, exhibiting a most marked superiority over the extracts commonly offered in commercial circles.

Prof. Ryan said powdered extracts of such quality were much wanted, but that it seemed that the trouble of obtaining an extract only twice the strength of the drug, hardly paid, as double the amount of the drug would produce the same result. There was one peculiarity, he thought commendable, and that was that these extracts represented a definite quantity of the drug, and not so much

of the extract, as that would be comparatively an indefinite amount of medicinal value.

Joseph Crawford, Ph.G., exhibited a most interesting and varied assortment of fibres and roots, from different sources, the beautiful silky whiteness of the Ramie fibre, grown in Georgia, was commented upon. The whole collection elicited much admiration, as showing how much might be done in the way of providing sources of supply both abundant and cheap, because of the facility with which many of them could be prepared for use either as textile materials or paper stock. It was remarked that it was singular, that while the Government was yearly spending considerable sums on investigations pertaining to these matters, they were permitted to lapse out of sight and attention.

The following list comprises the most important fibres shown :

Long leaf Pine, *Pinus palustris*, leaf, coarse and fine fibre, oakum, upholstery fibre, colored yarns and woven materials, chiefly mattings.

Saw Palmetto, *Serenos serrulata*, a bundle of fibres, New Zealand Flax, *Phormium tenax*, in the fresh and the dried leaf, bleached and unbleached fibre. This Flax was the chief vegetable constituent of "Staff" at the Columbian Exposition.

Refined Ramie from *Boehmeria nivea*, grown in Louisiana.

Jute from *Corchorus Capsularis*, grown in Texas.

Hemp from *Cannabis sativa*, grown in Kentucky.

Sisal from *Agave sisilana*, in Florida.

Cocoa nut fibre from the outer husk of *Cocos nucifera*.

Tampico from *Agave heterocantha*, natural fibre, cocoa colored, black and also gray. From Mexico.

Rice Root for brushes, from *Oriza sativa*, in Mexico.

Manilla, *Musa textilis*, Philippine Islands.

Raffia, from a Madagascar Palm, *Raffia Ruffia*, in crude fibre, used by horticulturists, and dyed fibres made up into curtains of 5 yards long for house decorations.

The other fibres that are being investigated by the Government are the following, of which no sample products could be obtained :

Swamp Milkweed (*Asclepias incarnata*).

Velvet Leaf (*Abutilon avicennæ*).

Swamp Rose-Mallow (*Hibiscus moscheutos*).

Canadian Hemp (*Apocynum cannabinum*).

Black Mulberry (*Morus nigra*).

Wood Nettle (*Laportea canadensis*).

Leather wood (*Dirca palustris*).

Cat Tail (*Typha latifolia* and *angustifolia*).

Pine Apple (*Ananassa sativa*).

Florida Moss (*Tillandsia usneoides*).

Cane Fibre (*Arundinaria tecta*)

Bear's Grass (*Yucca filamentosa* and *baccata*).

Burdock (*Arctium Lappa*).

Southern Cypress (*Taxodium distichum*).

Century Plant (*Agave americana*).

The following Japanese Papers and Fibres are of these peculiar origins :

Finest quality writing paper and also their paper for currency is obtained

from the injured cocoon of the silk worm. It is equal to our bond paper and of a better appearance.

Ito-Masa or Thread grass, from *Thuja obtusa*, an arbor vitæ, for shaving work as it is susceptible to a very close shaving, of great durability and can be then worked up into articles of utility as well as decoration. The finest article of this kind is 2½ yards long and 8 inches wide, and is fastened upon paper and used for writing only by the Emperor and those associated with him.

Rice Straw from *Oriza sativa* for cordage, paper of all descriptions from writing to wrapping.

Paper Mulberry or Kuwa, *Broussonetia papyrifera*, furnishes as much if not more paper bulk than the Rice straw and the two are often used in combination with each other and the Mitsumata Bark, *Edgeworthia papyrifera*.

The Ganpi, *Wickstroemia canescens*, furnishes the best quality of tracing paper, as it has the highest lustre.

Tengujyo, a mixture, but principally Mulberry, is used for papering window glass instead of using ground glass.

Sukikomi, a Mulberry paper, is the ordinary Japanese napkin, while the finer grades of these articles are made from the Mitsumata Bark. Another glass covering in colors is a beautiful paper obtained from a seaweed and resembles very much a gelatin film, but has no gelatin properties.

Professor Ryan exhibited an automatic bottle filler, invented by Mr. Verbur. It consists of two measuring chambers connected together by pipes, in which was a three-way cock. When turned in one way it opened a pipe leading to a hose attached to the container, located in an upper room or at least at some elevation. Through this hose one of the chambers is filled while the other may be emptied, upon reversing the cock the flow from the container is directed to the container just emptied, and the container just filled discharges its contents into the bottle placed to receive them. The measuring chambers are made of various sizes from four ounces to one pint.

Professor Lowe exhibited a prescription check device. It consists of a plated rod supplied with a number of chips and checks. When the prescription is received a check is given to the party presenting the prescription which is at once attached to the clip and is so retained until the prescription is delivered. A discussion followed, but the general opinion was that the best way was to affix the name of the party to the prescription.

Mr. F. L. John's plan of giving a card upon which diagonal lines were ruled and then cut in half, one part being given to the messenger, the other kept with the prescription, was also commented on.

The thanks of the College were tendered to the various authors, and the papers referred to the Publication Committee for publication.

There being no further business, on motion adjourned.

T. S. WIEGAND,  
*Registrar.*

## EDITORIAL.

As with this number of the "American Journal of Pharmacy," the temporary arrangement existing since the death of its late lamented editor, Prof. John M. Maisch, will cease, and the April number will bear upon its title-page the name of a new editor, it seems fitting that a brief historical statement should be made, reviewing its record of more than sixty-eight years. The "American Journal of Pharmacy" was first issued as a 32-page pamphlet in December, 1825. Its title at that time was the "Journal of the Philadelphia College of Pharmacy." The editorial staff consisted of the following Publication Committee: Samuel Jackson, M.D., Henry Troth, Solomon Temple, Ellis H. Yarnall and Daniel B. Smith. About one number was issued yearly until 1829, (in all four numbers), when volume II (or vol. I, new series) was issued under the editorship of Benj. Ellis, M.D. In this volume occurs a review of the revised issue of the United States Pharmacopœia. Volume III, 1831, was edited by R. E. Griffith, M.D., Lecturer on *Materia Medica* and Pharmacy in the Philadelphia School of Medicine.

In April, 1835, the first volume of a new series was issued under the present title of the *American Journal of Pharmacy*. R. E. Griffith, M.D., still occupied the editorial chair with the title of Professor of *Materia Medica* in the Philadelphia College of Pharmacy. In 1836, Joseph Carson, M.D., became editor. Robert Bridges, M.D. became associate editor with Dr. Carson in 1838. In 1847, the editors were Joseph Carson, M.D., and Professors Bridges and Procter. Dr. Bridges withdrew in 1848 and left the names of Jos. Carson, M.D., and William Procter, Jr., upon the title-page as the editors. In 1850, the former withdrew from active work, although his name is found among the Publishing Committee, while Prof. Procter assumed sole editorial charge. This position he retained continuously until 1871, when he asked to be released from the continued strain and pressure of work. Prof. John M. Maisch then became editor. How faithfully our lamented colleague filled this trust during the 22 years ending with his death last fall, all who have seen the Journal during this period can testify. To fill the place of such an editor was the problem presented to the College at its recent annual meeting. We believe that a happy solution of the difficulty has been reached in the selection of Prof. Henry Trimble, whose name appears for the first time as editor upon this number.

Prof. Trimble has been so frequent a contributor individually, and through the work of students in his laboratory, as to require no introduction to the readers of this Journal. We hope that under his editorial supervision the Journal will enter upon a new period of usefulness to those interested in Pharmacy and cognate sciences.

S. P. S.

## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*The Dispensatory of the United States of America.* By Dr. Geo. B. Wood and Dr. Franklin Bache. Seventeenth Edition. By H. C. Wood, M.D., LL.D., Professor of Materia Medica and Therapeutics, etc., in the University of Pennsylvania; Joseph P. Remington, Ph.M., F.C.S., Professor of Theory and Practice of Pharmacy in the Philadelphia College of Pharmacy, and Samuel P. Sadtler, Ph.D., F.C.S., Professor of Chemistry in the Philadelphia College of Pharmacy. Philadelphia: J. B. Lippincott Company. 1894. Pp. 1930.

After the lapse of but five years, a new edition of the United States Dispensatory has been called for, and that demand met by the present volume, which has not only been revised, but largely rewritten. The necessity for this has in part arisen from the sweeping changes in the seventh revision of the U. S. Pharmacopœia, as well as from the advent of the numerous synthetical remedies.

One of the notable additions to this edition is an Index of Diseases. The value of such an index is apparent to the physician, who only has as his subject the name of the disease, and who must, therefore, consult the titles from that standpoint.

After a careful perusal of many of the titles, the verdict naturally is that the book is fully abreast with the times. All of the changes in the new Pharmacopœia are introduced and commented upon. In the matter of chemical nomenclature alone, the improvements are numerous; the one requiring that the basylous or metallic component of a compound shall be placed first, being an important one.

In botanical nomenclature, the authors have refrained from too radical changes, deeming it important not to make useless alterations at the risk of confusion.

In every department the most recent advances have been chronicled; as an illustration of this, it may be stated, that the services of Dr. H. H. Rusby were obtained to furnish, for the article on Cinchona, his extensive researches made on the plant in South America and on the commercial product in the trade centres of London.

A special feature of the United States Dispensatory, which has been amplified in this edition, is the description devoted to groups or classes of compounds, by which the relations of different members of a group are shown. For instance, the carbohydrates have been classified according to the latest researches of Emil Fischer. By this means one is able to see at a glance the relations existing between the sugars, starches and gums, as well as that among the sugars themselves. The same remarks apply to the fixed and volatile oils, resins and a number of other classes.

The industrial chemistry of the subjects on which it has a bearing has been well written and brought fully up to date, and in all the articles where statistics are possible the latest obtainable have been inserted. All the recent investigations in plant chemistry have been noticed, and the results inserted up to the present year. Part II contains, in Section 1, the "National Formulary of Unofficial Preparations," and in Section 2, "Drugs and Medicines not Official." This latter now embraces more than one thousand titles, an increase of twenty-five per cent. over the previous edition. It is here that most of the new

synthetic remedies are described. An example of the thoroughness of this part of the work is illustrated in the article "Trional and Tetronal," in which the relation to each other as well as that to Sulphonal is shown and explained by the constitutional formulas.

The United States Dispensatory, as now perfected, stands as an encyclopædia of the medical and pharmaceutical sciences without a counterpart. With it both the physician and pharmacist are equipped with the means of obtaining the latest and most exact information concerning the natural history, properties and uses of all the medicinal agents employed and handled by them.

*A Standard Dictionary of the English Language, Vol. 1.* By I. K. Funk, D.D., Editor-in-chief; F. A. March, LL.D., Consulting Editor; D. S. Gregory, D.D., Managing Editor, and the following Associate Editors: John Dennison Chaplain, M. A.; Rossiter Johnson, Ph.D.; Arthur E. Bostwick, Ph.D. New York, Toronto and London: Funk & Wagnalls Company. 1894.

The first volume of this grand work has recently reached us. It has been in preparation for over three years, and when one comes to examine it carefully, he is surprised to find so much has been accomplished.

In addition to the above-mentioned editors, a staff of specialists, numbering over two hundred, has rendered assistance where occasion demanded it. The work will be complete in two volumes, and will then contain about 300,000 words and phrases.

It may be said of this volume that it is a dictionary in the fullest sense of the term. Doubtless, it will be welcomed by everyone who desires to have the latest information in the most compact form. Illustrations are freely distributed through the text, and a number of full-page colored plates add to the value as well as beauty of the work.

Pharmacists, chemists and physicians will be especially interested in this dictionary, because in it are to be found the most advanced methods of spelling chemical terms, as adopted by the Chemical Section of the American Association for the Advancement of Science. Although we believe it is a step in the right direction, we refrain from too sweeping a commendation of this innovation; because it includes the dropping of the final *e* from the names of the alkaloids, whereby they lose the character which distinguishes them from glucosides and other plant compounds which do not contain nitrogen. Those who desire to adopt this spelling reform can now do so with the knowledge that they have a standard authority back of them.

The question of price is such an important one in a large work, it will interest many to know that, when complete, the one-volume edition will be sold at \$12 to \$18, according to the binding, or the two-volume edition at \$7.50 to \$11 per volume.



# THE AMERICAN JOURNAL OF PHARMACY

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MAY, 1894.

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## MYRICA NAGI *Thun.*

BY DAVID HOOPER.

Quinologist to the Government of Madras.

Among the large number of astringent drugs indigenous to the East Indies, the bark of the Boxmyrtle (*Myrica Nagi*) has been long known. This tree belongs to a small natural order placed between the Urticaceæ and the Casuarinæ, and grows in India, the Malay Islands, China and Japan. The bark is collected in the sub-tropical Himalayas at altitudes of from 3,000 to 6,000 feet, and is occasionally exported in large quantities to the plains. It is used as a tan for fancy leather work, and in some districts it is employed for dyeing a peculiar pink; but as it is kept in stock by the native drug shops in Northern India this would indicate its chief use as a medicine.

In Sanskrit works the bark is described as heating, stimulant, and useful in diseases supposed to be caused by deranged phlegm, such as catarrhal fever, cough and affections of the throat. But like most Eastern remedies the bark is mostly prescribed in the form of a mixture with other stimulants, alteratives and aromatics. Dr. U. C. Dutt speaks of the powdered bark being simply used as a snuff for catarrh with headache. *Kaiphāl*, the Hindustani name of the drug, mixed with ginger, according to some doctors, is the best medicine for cholera. Hindus and Mohammedan use *Kaiphāl* at the present day as an astringent carminative and tonic, and prescribe it for chronic cough, fever and piles. Mixed with vinegar it strengthens the gums and cures toothache. It will be seen that it is used where astringents are required, either as an external or

internal remedy, but the large dose of 60 grains of the powdered bark is not the best method of administration.

About five years ago, Dr. Dymock sent me for analysis a sample of *Myrica Kino*. This substance occurred in a granular condition; it was of a dark purplish-red color, hard and brittle when dry, and without any peculiar odor. It dissolved almost completely in boiling water, but a flocculent red precipitate separated when the decoction cooled. A tincture made with rectified spirit was of a fine, bright red color and very acid in reaction. The tannic acid gave a greenish color with ferric chloride, and was estimated in a cold watery infusion of the drug with a solution of plumbic acetate. The "Kino" had the following composition:

Pure tannic acid, . . . . .	60.8
Insoluble in water, . . . . .	3.3
Moisture, . . . . .	9.8
Ash, . . . . .	10.8
Sugar, etc., . . . . .	15.3
	<hr/>
	100.0

The large amount of carbonated ash left, on incineration, points to the probability of some of the tannic acid existing in combination with a mineral base, and this was really so. A large quantity of a substance readily reducing Fehling's test, is not a usual constituent of a natural astringent secretion like Kino, and I was relieved to find that the above substance had been prepared by evaporating a watery extract of the bark; this would account for the mineral matter and the glucose.

The bark of *Myrica Nagi*, when collected from large trees, is about half an inch thick, extremely scabrous, pitted from the separation of pieces of suber, of a mottled rusty brown and dirty-white color, suber warty; substance of bark and inner surface of a dull red color; it yields a red color to water; taste strongly astringent. Examined microscopically, within the suberous layer is seen a remarkable stratum of stony cells; the parenchyma throughout is loaded with red coloring matter, and permeated with large laticiferous vessels, from which a gummy latex exudes when the bark is soaked in water.

Mr. J. Ishikawa (*Chemical News*, December 3, 1880, p. 275) contributed a paper on materials containing tannin found in Japan, and from a substance named "Shibuki" bark (*Myrica rubra*) he obtained

from 11 to 14 per cent. of tannin. If we may conclude that this tree is the *M. rubra*, Sieb. et Zucc., then it is synonymous with *M. Nagi*, Thunberg, the very tree under discussion.

A sample of *Kaiphah* bark, from Bombay contained 11 per cent. of moisture and yielded 7.17 per cent. of ash. Estimated in the manner above mentioned, for tannin, it afforded 13.7 per cent. The lead compound of the organic acid contained 30.72 per cent. of oxide, a result which compares very closely with the amount found in the compound separated from the "Kino," namely, 31.88 and 30.36 per cent. in two estimations. The tannic acid, separated from the tincture by evaporation and treatment with water, gives a bluish-purple color with ferric chloride, but on adding this reagent to a decoction of the bark, a dirty green precipitate is formed.

Beyond determining the amount of tannic acid in an authentic specimen of this bark, and obtaining indications of an alkaloidal principle, I have not had opportunity for further examining the drug. It may on closer research be found to contain interesting crystalline principles, such as those recently separated from its neighboring plants, species of the *Ficus* and *Casuarina*.

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## MYRICA ASPLENIFOLIA L. —

BY CHARLES C. MANGER, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.  
No. 134.

An analysis of the rhizome of this plant was published by J. C. Peacock, in the American Journal of Pharmacy, 1892, p. 303.

The present analysis, which was carried out under the supervision of Prof. Henry Trimble, was made with the view of adding to the results of the above work and of contributing to the knowledge of the constituents of the leaves of this plant.

All the plant material used in this work was collected by the writer near Haddonfield, N. J.

After having been finely ground, 50 grams each of the leaves and rhizome were submitted to proximate analysis, Dragendorff's scheme being followed in the main.

The quantities of the different constituents in the aliquot parts of the extracts used are eliminated, and in their places are stated the percentages calculated on the above quantity.

The amounts of the petroleum ether, ether and absolute alcohol extracts were estimated by evaporating the whole extract to a constant weight on the water-bath.

In the case of the water, alkaline water and acidulated water, the total solids of the extract were determined by evaporating an aliquot part of the liter (to which volume all these watery extracts were adjusted) to constant weight at the above temperature.

The dried residue was ignited to estimate ash. The difference between total solids and ash was taken as organic solids, and upon the amount of these are based the percentages of these three extracts.

The ashes of the petroleum ether, ether and absolute alcohol extracts were too small to exact consideration.

In all cases glucose was tested for and estimated by making the liquid alkaline with sodium hydrate and then heating with Fehling's solution for twenty minutes on a water-bath. The cuprous oxide was then collected, washed, dried and converted by ignition into cupric oxide. Of the weight of the latter obtained, 45 per cent. was taken as the amount of glucose present in the fractional part of the extract under examination.

After boiling an equal volume of the glucose containing liquid, with one per cent. hydrochloric acid, and then making alkaline and following the above plan, any increased reduction of the copper solution was attributed to saccharose, the amount of which can be readily calculated from the relative molecular weights of the two sugars.

Previous to applying the above processes for the determination of these substances, tannin and coloring matter were removed by means of lead acetate. The filtrate from the lead precipitate was freed from lead by means of hydrogen sulphide, and, after filtering out the lead sulphide, the excess of this gas was dissipated by warming the liquid, which, when cooled and made alkaline, was in condition for treatment with Fehling's solution.

The tannin was determined by the method given under the special heading.

In the distilled water extracts, mucilage and albuminoids were estimated by mixing a portion of the liquid extract with four times its volume of alcohol; in the alkaline water extract this treatment was preceded with sufficient acetic acid to slightly acidify the liquid.

In all cases, after mixing with the alcohol, the liquid was allowed to stand for twenty-four hours, before collecting, washing, drying and weighing the precipitate. The washing was accomplished with a mixture of one volume of water and four volumes of alcohol.

The ultimate analyses were made by combustion in an open tube with copper oxide and a current of oxygen.

*Moisture.*—Weighed quantities of the leaves and rhizome were dried to constant weights at 110° C. The loss was considered as moisture. The leaves showed 8.40 per cent. and the rhizome 10.85 per cent.

*Ash.*—The dried residues from the moisture determinations were ignited in order to estimate the amount of inorganic constituents in the materials under examination. The ash of the rhizome equalled 2.27 per cent. and that of the leaves 2.76 per cent. of the original weight taken.

Analysis showed calcium and potassium sulphates and calcium and iron phosphates in the ash of the rhizome; while in that of the leaves it revealed the presence of potassium and calcium combined with sulphuric and hydrochloric acids, together with iron and calcium phosphates.

Silica was found in the ash of both.

The rhizome yielded .74 per cent. of extract to the solvent action of petroleum ether, which was the first solvent employed.

The extract was of brown color and had a waxy lustre and fatty odor. It was soluble in absolute alcohol. When dissolved in petroleum ether and the solvent spontaneously evaporated, the waxy substance was deposited in a granular or crystalline form.

The corresponding extract of the leaves amounting to 2.52 per cent. was greenish black color, and of semi-solid consistence. Absolute alcohol dissolved about 50 per cent. of this extract, and left undissolved a black residue which was firm and waxy when cold. That portion of the extract which was soluble in absolute alcohol consisted mainly of resin and chlorophyll, the former of which was precipitated on the addition of water. The precipitate was soluble in solution of potassium hydrate, and was again obtained by acidifying the latter.

Stronger ether removed 2.04 per cent. of extract from the rhizome and 4.49 per cent. from the leaves. The first was a brown porous substance having a narcotic odor; the second a hard and brittle

extract of a dark green and shining appearance. Both extracts were largely resinous.

They were treated with hot water and the latter was filtered off while still warm.

Neither potassium cyanide nor ferric chloride gave indications of gallic acid in the cold water-soluble part of the extract of the rhizome. The former but not the latter reagent showed evidence of its presence at the same stage in the treatment of the leaves. Glucose was not contained in the water solution and glucosides were absent as was proven by boiling part of the solution with one per cent. sulphuric acid and making alkaline, Fehling's solution not being reduced.

That part of both extracts not soluble in water was treated with one per cent. sulphuric acid. This was filtered off, and the filtrates shaken successively with petroleum ether, ether and chloroform. No residues were obtained when the solvents were spontaneously operated, nor was anything removed from the filtrates after making them alkaline with ammonium hydrate and repeating the agitations with the above liquids in the same order. The resinous residues (and chlorophyll, in case of leaves), which were left after treating the extracts with water and one per cent. sulphuric acid, were soluble in absolute alcohol, from which they were partly precipitated upon the addition of water. This precipitated matter from the leaves was completely soluble in alkaline hydrates, producing solutions which were precipitated by dilute acids; while that from the rhizome was not altogether dissolved by the same solvents. Heat caused the undissolved part to settle in the form of a white flocculent precipitate, which is subsequently more fully noted.

Absolute alcohol, which was the next solvent applied, extracted from the rhizome 8.46 per cent. of porous, red-brown, substance and from the leaves 10.81 per cent. of black, brittle and bitter extract.

Both extracts were astringent, the first was soluble in water, with the exception of some dirty, reddish residue consisting mainly of resin, similar to that found in the ether extract. Water dissolved the greater portion of the extract of the leaves, but left undissolved a soft black mass composed of chlorophyll and resin which in this case, also, resembled that found in the ethereal extract. The water-soluble part of the extract of the rhizome contained 5.44 per cent. of tannin and .53 per cent. of glucose; while that of the leaves

showed 8.74 per cent. of tannin, .64 per cent. of glucose, and a smaller amount of saccharose.

The rhizome and leaves were next treated with water, which removed 6.96 per cent. of organic solids from the former, and 8.44 per cent. from the latter.

Each extract was made to measure one liter. Both were neutral in reaction. That of the leaves possessed a darker color than did the one from the rhizome. They contained the following principles to the amount given :

	From Rhizome.	From Leaves.
Mucilage and albuminoids, . . . . .	1.52	.60
Tannin, . . . . .	.83	1.33
Glucose, . . . . .	.65	1.40
Saccharose, . . . . .	{ small quantity.	{ small quantity.

After treatment with the preceding solvents, one liter of .2 per cent. solution of sodium hydrate applied to each of the materials extracted 4.31 per cent. of organic solids from the rhizome, and 4.82 per cent. from the leaves. Both liquids were very dark, and both contained phlobaphene. Mucilage and albuminoids were present to the extent of 2.80 per cent. in the rhizome extract, and .72 per cent. in the extract of the leaves.

After washing out all the alkali from the residues of the leaves and rhizome, they were subjected to the solvent action of a .2 per cent. hydrochloric acid; the latter being used in successive portions until one liter of applied liquid was obtained in each case.

The liquids were yellow in both cases, that of the rhizome was found to contain 1.90 per cent., and that of the leaves 1.80 per cent. of the organic matter of the respective parts of the plant.

1.20 per cent. of pararabin and calcium oxalate were found in each extract by making a portion alkaline with ammonium hydrate, mixing it with four volumes of alcohol, allowing the liquid to stand for twenty-four hours, collecting, washing, drying and weighing the precipitated substances. A little over 50 per cent. of the leaves were found to have been dissolved by the above solvents.

That portion of the rhizome which remained after extraction with solvents was treated with chlorine in the presence of water. The loss in weight that was experienced showed that 8.15 per cent. of ligneous matter had been removed. When the residue from the above treatment was further acted upon with potassium chlorate

and nitric acid, a loss of 34.86 per cent, representing hydrocellulose (starch) and incrusting substances, occurred.

Deducting the weights of inorganic constituents still present, cellulose to the amount of 17.68 per cent. was left.

*Volatile Oil.*—To ascertain the presence of this, separate distillations were made of the fruit, leaves, stem and rhizome. In all cases the part was macerated with water over night, previous to distillation with it.

Thirty grams of the fruit collected in June gave a distillate of a very disagreeable odor. Petroleum ether agitated with this distillate removed a small amount of crystalline substance.

.5 kilogram of leaves similarly treated yielded a very aromatic distillate from which ether removed a small amount of volatile oil having a camphoraceous odor and a burning taste.

The oil obtained in this experiment resinified in a few days.

Another quantity of oil was obtained from the leaves in the same manner as was employed in the first case. This second sample was dried by means of calcium oxide and afterwards dissolved in absolute ether, the solution filtered and spontaneously evaporated. A clear yellowish oil was thus obtained and after standing for two weeks showed no tendency to become resinous.

The oil was specifically lighter than water. When distilled with water, the stem furnished traces of oil only, while from the rhizome still less was obtained.

*Resins.*—.5 kilogram of the leaves were percolated with acetone, the solvent recovered and the residue poured into water, which produced a turbid yellow mixture, and separated a soft, black, resinous precipitate, having a warm and acrid taste. The precipitate was dissolved in alcohol, and the solution so obtained poured into water which again threw out the resin and coloring matter. These substances were dissolved in alcohol, and when the latter was allowed to evaporate, were obtained in their original form. The residue was dissolved in chloroform and the solution agitated with weak solution of potassium hydrate. Upon separating the alkaline layer and slightly acidifying with dilute sulphuric acid, a brown resin was precipitated. This after drying was brittle.

Repeated and prolonged digestion of an alcoholic solution of this resin with animal charcoal did not serve to change the color, so the substance was re-obtained by evaporating the solvent.



The extract from a kilogram of the rhizome, prepared as in the case of the leaves, when poured into water gave a yellowish granular precipitate. This was dissolved in alcohol, and upon spontaneous evaporation of that liquid was obtained as a crystalline resin along with some amorphous resinous matter and a granular whitish substance. The last was found to be insoluble in cold alcohol after it had been separated from the resinous substances. A hot alcoholic solution of it was digested with animal charcoal and then filtered. Upon cooling, the principle was obtained in white flakes. The crystalline and amorphous resinous substances were treated with petroleum ether to remove waxy matter and then dissolved in alcohol.

The alcoholic solution was decolorized by animal charcoal, and, upon concentration, the filtrate separated stellate groups of colorless crystals. These melted between 200 and 205° C.

The absence of nitrogen in these crystals and in the white substance was proven by heating them with metallic sodium, treating the fused mass with water, adding ferric and ferrous salts and then supersaturating the alkali with hydrochloric acid, whereby no ferric ferrocyanide was produced. The average of the two combustions made of the crystals was :

Carbon, . . . . .	76.16
Hydrogen, . . . . .	10.43
Oxygen, . . . . .	13.41
	<hr/>
	100.00

When the white substance was heated in a paraffin bath to 25 ° C., it shrunk and became gray, but did not melt. When heated on platinum foil, it fused to a dark liquid and was completely consumed with the production of a luminous flame. It was identical with the substance noticed in the ethereal extract and was undoubtedly the granular substance noticed by Peacock (loc. cit.) during his investigation of the same extract. The white flaky substance was submitted to ultimate analysis; the following is the average of three combustions :

Carbon, . . . . .	73.50
Hydrogen, . . . . .	11.53
Oxygen, . . . . .	14.97
	<hr/>
	100.00

The carbon showed signs of increasing with further purification, but lack of material prevented further work on the compound.

*Tannin.*—The amount of this constituent was determined by estimation of the separate parts gathered at different times of the year. The tannin was precipitated from decoctions representing 25 grams of the material in a liter. The decoctions of the rhizome were of a yellow color, those of the leaves and stem were reddish-brown.

A solution of 2 grams of gelatin and 10 grams of alum in the liter was used as a precipitant of the tannin. The precipitations were carried out in hot solutions. The precipitates were collected, washed with hot water, dried and weighed. Of the weight obtained, 54 per cent. was taken as the equivalent of gall tannin.

The estimations were made within twenty-four hours after the material was collected. The average of two or three closely agreeing results was used.

Month.	Tannin in moist state. Per Cent.	Moisture. Per Cent.	Tannin in absolutely dry state. Per Cent.	Ash. Per Cent
<i>Leaves:</i>				
June,	6.35	10.15	7.06	4.85
July,	9.42	8.40	10.28	2.76
<i>Stem:</i>				
July,	3.72	10.64	4.16	1.46
<i>Rhizome:</i>				
June,	3.46	10.87	3.88	2.27
August,	5.47	9.96	6.00	2.27
September,	4.86	9.85	5.33	2.25
January,	4.43	8.22	4.82	1.97

*Preparation and Purification of the Tannin.*—The filtrates from the precipitated resinous matters were used as the sources of this constituent. The following experiments were made on both leaves and rhizome. Attempts to remove the tannin by agitation with acetic ether were not attended with much success, as only a very small quantity of dark colored material was removed. A portion of the filtrate was precipitated with basic lead acetate, the precipitate collected, washed, suspended in water and decomposed by hydrogen sulphide. The lead sulphide was removed by filtration, and after the excess of hydrogen sulphide had been expelled by warming, part of the filtrate was shaken with acetic ether, but no more nor purer tannin was obtained than in the first attempt to separate it. The whole filtrate was then saturated with sodium chloride, and again agitated with acetic ether. Upon recovering the solvent under diminished pressure, a porous, reddish residue remained. This

was dissolved in commercial ether, and the filtered liquid evaporated under reduced pressure, whereby a porous tannin was obtained. The yield was larger from the leaves than from the rhizome.

No process of extracting and purifying these tannins could be called quantitative. A weak solution of the tannin gave the following reactions. For comparison there are also added the reactions of the tannin of galls and of canaigre.

TANNINS FROM

Reagents.	Myrica.	Galls.	Canaigre.
Ferric chloride, .	dark blue ppt.	dark blue ppt.	green ppt.
and	brownish-black ppt.	{ brown ppt., purple liquid.	brown ppt.
Ammon. hydrate, }			
Lead acetate, . . .	whitish ppt.	white ppt.	yellowish ppt.
Gelatin, . . . .	pinkish ppt.	white ppt.	yellow ppt.
Tartar emetic, .	no change.	white ppt.	no change.
and	flocculent ppt.	same unchanged.	flocculent ppt.
Ammon. chloride, }			
Potassium bichro-	yellowish-	brown ppt.	greenish-brown
mate, . . . . }	brown ppt.		ppt., darkening.
Calcium hydrate, }	pinkish ppt., darkening.	ppt. darkening.	{ light pink ppt., turning red and brown.
Bromine water, .	yellow.	no ppt.	{ yellow, then brown ppt.
Uranium acetate, }	brownish- red color.	brownish- red color.	{ crimson color, upon standing a reddish-brown ppt.
Ferric acetate, .	blue ppt.	blue ppt.	green ppt.

Starch having been detected in a cooled decoction of the rhizome, a separate estimation of it was made on the original material. For this purpose 2 grams of the fine powder were boiled for six hours with a 4 per cent. alcoholic solution of potassium hydrate. The residue was washed with alcohol till freed from alkali, and afterward with water to remove all coloring and soluble matter. The thoroughly washed starch granules and accompanying woody portions were boiled for three hours with one per cent. hydrochloric acid to convert the starch into glucose, which was estimated in the manner described above. The amount of starch which was calculated by proportion from the respective molecular weights of glucose and starch and the amount of glucose obtained, was found to be 8.24 per cent.

Starch was not found in the leaves.

## NOTES ON THE GENUS MYRICA.

BY GEORGE M. BERINGER, A.M., PH.G.

The order *Myricaceæ* or family of Galeworts, as now constituted, contains but a small group of plants, generally classified with the *Amentaceæ*. In its botanical relationship it is anomalous, being closely allied to several orders. Lindley characterized the "fragrant gales as just half way between the urtical and amental alliances." While its relations extend toward several orders, the aromatic character, the floral arrangement and fruit characters of these plants indicate its close approach to the *Juglandææ*. From this order they are, however, distinguished by the superior free ovary and small slightly lobed seed, and different habit.

In accordance with the classification of Bentham and Hooker (*Genera Plantarum*), *Myricaceæ* as now constituted consists of but one genus, *Myrica*, whose characters become ordinal. The genera *Gale* of Tournefort and *Comptonia* of Banks being condensed into *Myrica*. The genus *Clarisia* of Ruiz and Pavon being referred to *Urticaceæ* and *Leitneria*, proposed originally by Chapman to describe our Florida species, *Leitneria Floridana*, Chapm. is raised to ordinal rank as *Leitnericæ*.

The genus contains about 35 known plants of an aromatic, shrubby character, distributed for the most part in the temperate regions. At least six species are indigenous to North America. But one species, *M. Gale*, L., is found in the bogs of Northern Europe. This is likewise generally distributed through the middle and northern United States, and extends as far north as Alaska. Several species are reported from the West Indies and one from the Andean region of South America. Others are found in Southern Africa, India and China. All medical writers and botanical authorities, even as early as Linnæus, describe the plants of this genus as useful in the arts and possessing valuable medicinal properties. As yet, they have obtained but little recognition in the practice of the medical profession.

*Myrica Gale* L. is the most widely distributed species. Some of its numerous synonyms are Sweet Gale, Meadow Fern, Bog Myrtle, Dutch Myrtle, Willow Myrtle, Bay Bush. The fruit of this species being resinous dotted, yields but a limited amount of waxy tallow. The leaves are known as *Folia Myrti Brabanticæ*,

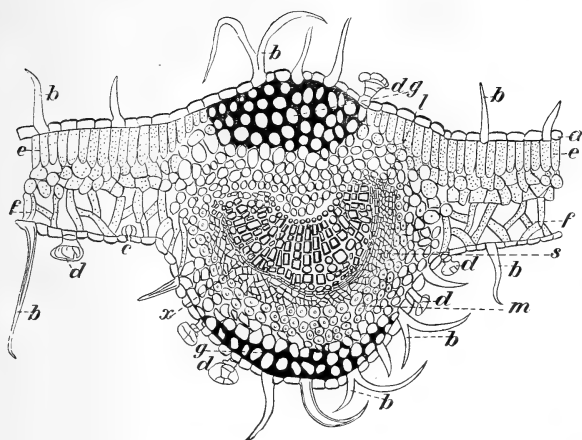


FIG. 1.

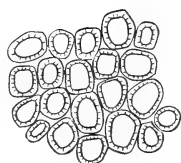


FIG. 4.

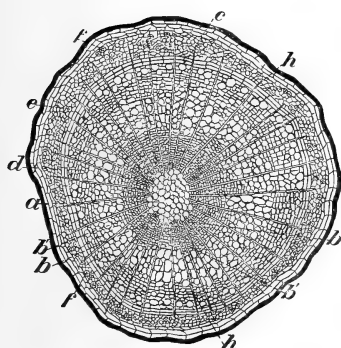


FIG. 2.

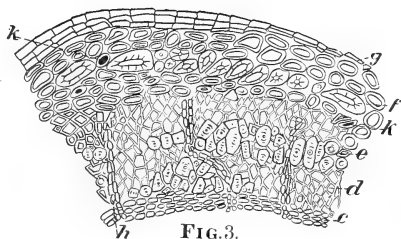


FIG. 3.

# EXPLANATION OF PLATE.

FIG. 1.

Transverse section through a leaf of *Myrica asplenifolia* L. at the midrib, greatly enlarged. *a*, epidermis. *b*, trichomes. *c*, stomata. *d*, glands. *e*, palisade parenchyma. *f*, spongy parenchyma. *g*, collenchyma. *x*, xylem portion. *l*, cambium. *s*, sieve portion. *m*, bast.

FIG. 2.

Transverse section of stem of *Myrica asplenifolia* L.  $\times 20$ . *a*, pith. *b*, xylem, spring growth. *b'*, xylem, fall growth. *c*, cambium. *d*, sieve portion. *e*, bast fibres. *f*, stone cells. *h*, medullary rays.

FIG. 3.

Section of cortex, showing sclerenchyma layer.  $\times 50$ . *c*, cambium. *d*, sieve portion. *e*, bast fibre. *f*, stone cells. *g*, cork. *h*, medullary rays. *k*, secretion cells.

FIG. 4.

Pitted pith parenchyma.  $\times 100$ .



and contain an essential oil. The entire plant is used and also the separated bark and leaves. To it is ascribed pectoral, astringent and aromatic properties. The infusion has been also applied externally for the cure of itch, and given internally as a vermifuge. The leaves have been used in Sweden as a substitute for hops in brewing. The entire plant is useful in dyeing and tanning.

The *Myrica cerifera* L. is the indigenous species that has attracted the most attention in the United States. Its common names are Wax Myrtle, Wax Berry, Candle Berry and Bay Berry. The fruit of this species is quite persistent, frequently adhering to the twigs for several years. The nuts are incrustated with a wax-like tallow, *Myrica* tallow. The wax was utilized by the pioneer settlers, and we have accounts dating back to the early part of the eighteenth century, of the methods generally adopted by each family to furnish themselves with a supply of this wax for lighting purposes. The South American species, *M. pubescens* W. (*M. caracasana* H.B.K.), contains similar fruit and has been utilized for the same purpose. According to an inaugural dissertation of George Schneider, Erlangen, 1890, the wax of *Myrica cerifera* is more closely allied to the fats than the waxes. He gives as its composition, palmitin 70 per cent, myristin 8 per cent., and lauric acid 4.7 per cent., mostly free. The bark of this species has attracted some attention, but principally among the eclectics, and is an ingredient in the so-called "Thompsonian Composition Powder." To the bark is ascribed stimulant, astringent, antiscorbutic, antispasmodic, sialagogue and errhine properties. It has been extensively used in domestic practice as a vegetable astringent in diarrhœa, and as early as 1804 Dr. Benjamin Smith Barton, then professor of Materia Medica and Botany in the University of Pennsylvania, called attention to it "as a powerful astringent used with success in diarrhœa," and states "the decoction has also been used with much advantage in dropsical affections succeeding intermittents and in the treatment of hæmorrhage from the uterus, etc." The decoction has also been used as a gargle in inflammation of the throat and as an injection in leucorrhœa. The powdered bark has been applied externally as a stimulant to indolent ulcers. In large doses it is stated to be acrid, drastic and emetic. The leaves are also stated to be aromatic, stimulant and astringent.

The most common species in this locality is *Myrica asplenifolia* (L.) Banks. This species, the *Comptonia asplenifolia* of the earlier

manuals, is characterized by the globular fertile catkins, the ovary being surrounded by 8 long linear scales persistent in fruit. The leaves are narrowly lanceolate and pinnatifid, the lobes being numerous and rounded. In shape they resemble the fronds of the spleenwort fern and hence the specific name above given. They are pleasantly aromatic.

Our plant has enjoyed several names. Originally Linnæus placed it in the closely allied genus *Liquidambar*, naming it *Liquidambar peregina*. O. Kuntze now claims that the correct binomial should be *Myrica peregina*. *Liquidambar asplenifolia*, *Comptonia asplenifolia* and *Myrica Comptonia* are some of the names applied to it by various botanists. The common English names that have been given to it are Sweet Fern, Sweet Ferry, Sweet Bush, Fern Gale and Spleenwort Bush. Attention has recently been directed to the tannin present in a fair quantity in the rhizome and also in the over-ground portions of the plant. Lindley states that the aromatic bark contains Benzoic and Tannic acids with a resinous matter. The dried leaves yielded to Schimmel & Co., 0.08 per cent. of a peculiar volatile oil. The leaves and the rhizome and rootlets have been used quite extensively in domestic practice; tonic, astringent and alterative properties being assigned thereto. In the form of decoction, or this sweetened to make a syrup, it checks diarrhœa and is a favorite remedy in cholera infantum. It has been used for night sweats and the infusion externally applied in rhus poisoning. The dried leaves furnish the country lads with their first smoke. The syrup made from these leaves is a good disguise for quinine.

The writer is not aware of any published account of the anatomical structure of this plant. The leaf is quite hairy on the lower surface, especially at the midrib and margins. On the upper surface they are fewer in number, but more numerous along the midrib. The midrib is quite prominent on the lower surface of the leaf, and about 2 or 3 lateral veins extend into each lobe, and the anastomosing, while not prominent, can be distinctly seen. Fig. 1 (see plate), illustrates the structure as shown on transverse section through the midrib. The surface is well marked with simple trichomes, many of which are branched, and with glands. The conductive system or fibro-vascular portion of the midrib consists of a broadly wedge-shaped almost semi-circular xylem portion, the wood cells and ducts being arranged in distinct radial rows and subtended by a very narrow cambium



layer and a broader sieve portion. A crescent-shaped layer of bast cells extends beyond this, and in addition to this the mechanical system is strengthened by prominent layers of collenchyma cells situated below the epidermis and on either side of the midrib. The palisade and fundamental parenchyma cells are well filled with chlorophyll. The parenchyma toward the lower surface is of a spongy, open character.

The stem, on transverse section, exhibits a thin bark, the outer portion of which easily breaks away. The pith is irregular in shape and somewhat eccentrically located. The pith parenchyma cells possess somewhat thickened walls, marked with distinct pittings. The wood is in numerous narrow wedges, separated by narrow medullary rays extending well into the middle bark. The spring and fall deposits of wood are well marked layers, and the section shown in Fig. 2, made from the stem of a plant collected during the recent warm weather in March, shows that the deposition of the more open spring wood had already commenced. The cambium zone is narrow and is subtended by a rather broad phloem layer containing numerous bast cells. The bast cells are pearly white in color and are greatly thickened, the stratification being distinct and the cavities almost obliterated. In the parenchyma of the middle bark there are numerous large stone cells, forming almost a complete zone of sclerenchyma. Associated with the parenchyma of the cortex are a number of secretion cells filled with a reddish latex, and the cells of the phellogen are likewise impregnated with a similar substance. In the *Pharmacographia Indica*, Part VI, page 357, Hooper calls attention to a remarkable stratum of stone cells existing in the bark of the Himalayan species, *Myrica Nagi*, Thunb. A similar layer existing in *M. asplenifolia* L. would indicate that this was likely a structural characteristic of the order, and would warrant further investigation of other species.

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Chlorine water decomposes so readily that if found at all in the stores it is of poor quality. Sealed glass tubes containing five grams of liquid chlorine are now to be had in commerce. With one of these it is possible to extemporaneously prepare one kilo. of chlorine water.

## ANIMAL AND VEGETABLE FERMENTS.

BY WILLIAM B. THOMPSON.

A close examination of the functions of animals and plants or vegetables will reveal an analogy which becomes a highly interesting subject of study. The exact operations of the assimilative processes of plants, with their food-supply, are but meagrely understood or appreciated. In our own economies, we have reached some deductions which have proven great aids to physiological and medical science. The conversion of food into conditions in which it can be appropriated and become part of the living structure of animals and plants is accomplished by processes which, whilst they are exceedingly complex, yet are not, perhaps, beyond the possible limits of our knowledge. The fermentative processes favored by natural or artificial warmth and heat, and which are protected from destructive organic changes, seem to be one of the prime essentials in the wisely established scheme of the Creator for the supply of nutrition.

Whilst we may be able to effect some approximation to such change, by artificial methods, *outside* of these respective economies—animal and vegetable—yet we cannot penetrate into the living organisms and disclose exactly the intricate operations by which these are conducted. Therefore, we must, in a measure, grope and reach conclusion by logical deduction and observation.

Comparisons have been instituted between the peptic ferment of animal origin and its analogue as found in the juices of the *Carica Papaya* and the *Fructus Carica*. These comparisons have led to some interesting statements and observations, which deserve thought and attention, and should be taken up by the students of science, in which pharmacy can always find a legitimate sphere. In applying to both ferments their soluble action on albumen, we find, as usual, the pepsin active in the presence of egg-albumen in acidified media, whilst the evaporated vegetable juices, brought to a solid state, seem to act but feebly, if appreciably at all, upon the same substance—*i. e.*, egg-albumen—under like circumstances. Now, it is asserted that egg-albumen is an albuminate of calcium, and that we have no absolutely pure and isolated albumen. If the former be true—and it seems rational—a secret of the operation of pepsin in the weak acid (hydrochloric) solution may be better understood. If we consider for a moment, in this connection, that the chick derives its whole

calcareous structure, as well as the cartilaginous portion of its anatomy, from the substance enclosed within the shell, then calcium must certainly be there, pre-existent. Then, on the other hand, if vegetable juices or ferments are found to act best in alkaline media, it would indicate that, whilst there may be an analogy of function between the animal and vegetable ferments, yet they cannot indiscriminately be applied or used to restore diminished function in the *animal* economy. If the vegetable ferments, acting on the vegetable economy, change the albumen of plants to the more assimilable albumose in alkaline media only, this too would seem highly rational, because the normal juices of plants must be acid, else how could the soil-nutrition—the phosphatic elements—be taken up and appropriated?

In conclusion, it may be said, then, that these two ferments can only be compared in their analogy, their functions being adapted to different organisms. But these few cursory thoughts may furnish hints to the investigator and prove the initial of some interesting researches.

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### TEREBENE.

BY H. W. JAYNE, PH.D.

The Pharmacopœia of 1890 requires that a pure terebene should have a specific gravity of 0.862 at 15° C., and boil between 156° and 160° C. In a paper read before this society in 1887 (*American Journal Pharmacy*, 1887, p. 65), I showed that a pure preparation contains no fraction below 160° C., and the same conclusion was reached by Power and Kleber (*Phar. Rundschau*, January, 1894).

Since 1887, I have examined a very large number of samples, and have found that all really pure and inactive terebenes gave no fractions under 165°, and very few, if any, under 170°. In these samples I have also found a wide variation in specific gravity. When we consider the difference in the gravity of commercial oil of turpentine, and note that the Pharmacopœia does not require the turpentine used in manufacturing terebene to have a certain gravity, it is to be expected that the resulting preparations should show widely different gravities.

Experience has shown that terebene is approximately 0.02 lighter than the turpentine from which it has been made.

Some grades of undoubtedly pure oil of turpentine show very low gravities.

Recently a shipment of oil of turpentine was received, having a gravity of only 0.855, yet was without doubt pure, tests failing to show any adulteration.

A large quantity of this oil was treated as usual, with small quantities of sulphuric acid in successive portions, samples being taken after each addition. The following table gives the results of each test, and clearly shows how the gravity falls and the boiling-point rises as the product becomes more inactive. The first column shows the gravity of the mixture of terebene, colophene, etc., before distilling with steam.

	Gravity bef re distilling.	Gravity after distilling.	Rotation for 10 c.m.	Percentage distilling to									
				160°	165°	170°	175°	180°	185°	190°	195°	200°	
Original turpentine . . .	0.86	0.855	10° 45'	38	76	84	88	90	92	94	—	—	
After first acid . . .	0.88	0.852	9° 42'	18	64	80	85	88	90	93	—	—	
After second acid . . .	0.90	0.843	5° 52'	—	10	46	70	80	86	92	—	—	
After third acid . . .	0.92	0.840	2° 7'	—	—	6	45	68	80	85	88	93	
After fourth acid . . .	0.93	0.840	0° 16'	—	—	2	33	60	75	84	87	92	
After fifth acid . . .	0.94	0.835	0° 4'	—	—	8	46	68	78	82	86	89	

The crude terebene so obtained was then distilled to remove the higher boiling portions.

Examinations of commercial terebenes show that many of them contain a large percentage of oil of turpentine, yet they appear to be satisfactory to the medical profession.

If a terebene containing a small amount of turpentine gives satisfactory results, it appears useless to prepare a perfectly inactive article, for the yield is then very small and the cost of production correspondingly high. A terebene containing only 3 per cent. of turpentine, on being treated to render it inactive, showed a loss of 50 per cent.

Recent investigation has shown that the solvent action of Rochelle Salt, as shown on the hydrates of iron and copper, also exerts itself on the hydrates of zinc, manganese, nickel, cobalt, chromium and aluminum. (Chem. News, 69, 125.)

## SOME THOUGHTS ON PHARMACY AS A PROFESSION.

VALEDICTORY TO THE CLASS OF 1894, PHILA. COLLEGE OF PHARMACY.

BY SAML. P. SADTLER, PH.D., Professor of Chemistry.

The ceremony, which we have but just now witnessed, may mean but little to the careless looker-on, but it is an important event, at least in the lives of the 183 young students who have participated in it, and may we not believe that it has some importance also for the profession into which these new members are about to enter.

It is estimated that there are at present some 40,000 druggists in the United States. Now, if we had an army of 40,000 trained and experienced veterans, and the question was as to the addition of some 600 new recruits (supposing that to be the number of graduates this year from the different colleges of pharmacy), we would not entertain the idea for a moment that such an addition could exert any notable influence. But if we consider the responsibilities attaching to the work of a pharmacist, its close relations to the practice of medicine, and the fact that the issues of life and death often depend upon the skill and accuracy of the compounder of medicines as well as upon the learning and judgment of the physician, and then reflect that of these 40,000 druggist, not over 8,000 at most have had the education of a school of pharmacy, the case presents a different aspect. We must then look upon the strengthening of this educated element among the druggists by some 600 new recruits, freshly drilled in the most recent advances of science and the results of the best methods of manipulation, carefully gathered for them by able and experienced instructors, as a very important matter. It is the sending out of new leaven which shall work through the whole body of practising pharmacists, strengthening what is good in it, and exerting influences that may in time be powerful and far-reaching.

The recurrence of this annual event, the commencement of full professional activity for the large body of young men now before us, we believe this has some importance for the profession into which they are about to enter. At the same time it gives us an opportunity to pause for a few minutes and look at the condition of the profession of pharmacy, to consider some of the drawbacks to its prosperity existing at present, and to consider suggestions for its improvement.

The profession of pharmacy is a peculiar one. It differs in important respects from the so-called learned professions of law and medicine, not in requiring less, for a competent pharmacist must be well grounded in quite a range of the sciences, but in the peculiar conditions under which it is practiced. It is considered unprofessional for the lawyer or the doctor to advertise, but the pharmacist is a vender as well as a professional man, and is expected to bring his wares to the notice of the public. And just here arises the first danger to him as one who has a profession, for the practice of which he has been educated. It is to lose sight of the fact that if he is a professional man he must be content to rise slowly as the young lawyer or doctor does, to enlarge his circle of patrons gradually, but gaining their respect at the same time and holding it. He is tempted to look at the purely mercantile side of his position and to stoop to clap-trap methods of drawing attention to himself and his store. This is said to show American "push" and "snap," but certainly there ought to be some other outcome than that from the years spent in acquiring a professional education. He may get the name of a "hustler," as it is termed, but does it not appear on closer inspection, that such a reputation is gained in most instances at the expense of professional standing? The methods of rush and push, of turmoil and struggle have, I fear, completely taken control of most of the mercantile communities in our American cities and large towns, but would it not be better for the educated pharmacist to aid in keeping such methods out of pharmacy and by avoiding catchy efforts to attract trade, dignify his profession and his own standing in the community?

Of course, it will be said, and with some truth, that in large cities especially, the competition is so great that the newcomer is obliged to push himself forward in order to get a foothold, that if he does not, he will be left behind, will starve, it is often said. But a man of good sense can soon see a difference between proper commendable enterprise and the unprofessional and sensational efforts to push oneself into notice, of which I have just spoken.

Again, the invasion of the apothecary's field by the patent medicine man, and the cultivation and solicitation of the physician directly by the manufacturing druggist are drawbacks which the pharmacist has to contend with. But is it not the mercantile rather than the professional side of his activity that suffers, and is it not true that,

in proportion as he has developed the professional side, he suffers less from these difficulties?

In other words, if he has become known as a skilful and able pharmaceutical chemist himself, who has kept up with recent progress in chemistry and pharmacy, he will suffer notably less from such drawbacks than if he had staked all his success on attracting attention to his store by advertising novelties.

Another of the drawbacks to the proper recognition of pharmacy as a profession is the comparison so often drawn between it and the related profession of medicine, and drawn, I need hardly say, in most cases to the disadvantage of the former. It is not alone drawn by the doctor, who from the time he leaves the Medical College calmly draws a line between himself and the "laity," as he calls the rest of the world. This superiority of the medical profession is too often conceded as a matter of course by the pharmacist, who feels the necessity of gaining the good-will of the medical profession living in his neighborhood as a question of business. Is it any wonder then that the public take him at his own estimate, and grow accustomed to give a respect to the one profession that they deny to the other? This difference in valuation is only encouraged when the pharmacist proceeds to demonstrate his belief in it by taking up medical studies, even after years of practical business life and adding the medical degree to that of Graduate in Pharmacy. I do not wish to be misunderstood here. Many young men enter upon the study of pharmacy, and pursue it diligently with the full intention from the beginning of following it by studies in medicine. For such a plan, I have nothing but commendation. I have repeatedly heard medical men, who had pursued this plan, acknowledge the invaluable aid that the thorough grounding in a knowledge of drugs and medicines and their preparation acquired in a College of Pharmacy gave them in the after practice of medicine. But cannot the graduate in pharmacy, who has had no such plan of study, who has only started out to acquire a pharmaceutical education, feel that he has a worthy profession before him, if he will but strive to make himself worthy of it? He has had an insight during his college years into the methods of work in chemistry, both analytical and synthetical, in operative pharmacy, the field of which is becoming wider every day, in microscopical study of plant tissue and drug structure. Is there then nothing that promises results for him in all this, results that will bring him both pecuniary reward and reputation?

I am not saying that, if he devote himself somewhat to these things, he will thereby come to the reputation of a Liebig in chemistry, or a Procter in pharmacy, or a Maisch in his knowledge of *materia medica*. But he will raise the standard of his profession and will be honored individually in having contributed to this result. Nor will the result be empty glory.

If the pharmacist is known to his neighbors and to the medical profession with whom he comes in contact, as a good chemical analyst, a thorough botanist and pharmacognocist, and, above all, a skilled compounder of all classes of official pharmaceutical preparations, he can rest assured that he will succeed, if he has, in addition, good common sense. Of course, all of these educational qualifications referred to may be thrown away on a visionary, rash and impractical person.

I think we are ready now to consider some of the means by which the standard of the profession can be advanced and some of the drawbacks referred to removed.

In the first place, we want a better foundation to build professional study upon. With the development and strengthening of our common school system throughout the country, the liberal and scientific professions have been made accessible to a much wider range of individuals than was the case a generation ago. The son of the poor man is now able to start in life more nearly on terms of equality with the sons of the rich than was at one time the case. However, a common school education should be carried beyond the secondary school stage to enable a young man to appreciate the work put before him in coming to a college of pharmacy. Deficiencies in this preliminary education make it necessary for him to lose much valuable time in learning how to study and in developing his powers of observation and reasoning on experimental results.

This is not a condition of things without precedent in other professions. The medical profession was, and is to some extent yet, in a far worse condition. The young men beginning the study of medicine in many cases were not any better prepared to begin a professional study in a proper way, and, indeed, had less qualifications, as the year or two of shop practice which our students almost invariably have before coming to a college of pharmacy has been an introduction to the manipulation work of the laboratories. How did the better class of medical schools meet this deficiency?



In some degree, by preliminary examinations, but still more effectively by establishing graded courses and lengthening the course of study to three and four years.

The preliminary examination and the graded courses have been features of the work of our College for some years now, and the lengthening of the course to three years obligatory work will next follow. We must recognize the fact that the profession of pharmacy is setting a higher standard for its followers every year, as each successive revision of the U. S. Pharmacopœia shows, and more time will have to be devoted to the work of training for it. If, as said, a considerable part of the first year must perforce be devoted to teaching the student how to study, to observe, and to handle the necessary pharmaceutical and chemical apparatus, three years is not going to be at all in excess of the minimum requirement for systematic instruction. We have had three years of college work from a large number of our students in recent years, because of the division of either the Junior or the Senior course into the parts, which has been allowed under the name of the modified Junior and Senior courses. But the division was an arbitrary one, made to suit the student's convenience or fancy, and not always judicious. The whole subject of chemistry, for instance, in all its branches and applications had to be covered in two courses of lectures, and yet the student beginning without any knowledge of it, was supposed to be turned out well posted on the whole range of inorganic and organic chemistry and able to carry through the tests and assays required by the U. S. Pharmacopœia. With three courses of instruction, carefully graded and connecting together, it will be possible to cover more ground and cover it better than can now be done.

It is with much pleasure, therefore, that I can announce that the Philadelphia College of Pharmacy has determined to take this step towards improving the advantages she offers for thorough pharmaceutical education. With the beginning of the fall term of 1895, all students, candidates for her degree of graduate in pharmacy, will be obliged to enter for a three years' course, or coming from other colleges, and passing examinations for advanced standing, to take a corresponding portion of that time.

Not only will the lecture work be extended through three courses of systematically graded instruction, but during this time three thoroughly equipped laboratories will be open for instruction in the

practical and manipulative work of the three main lines of study represented in the college.

We hope thus to do our part in turning out young men able to enter upon the practice of pharmacy as a profession and not merely ready to open a store and cater to the public and its whims as the corner grocer does.

And now young men of the class of 1894, we have come to the last word. We have endeavored, as far as lay in our power, to assist you in getting your pharmaceutical education, and have brought you to the point when you are ready to launch out with your certificate of qualification to practice your profession. It is for you to say whether you will practice it in a manly, self-respecting way, or perpetuate and intensify the evils of which I have spoken by turning your back upon your opportunities, and forgetting your birthright as graduates of the Philadelphia College of Pharmacy.

That you may make such use of your powers as will make us proud of you and your record in the future, is the ardent wish and hope of your Alma Mater.

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## THE MANUFACTURE OF CALOMEL IN JAPAN.<sup>1</sup>

BY EDWARD DIVERS, M.D., F.R.S.

*Introductory.*—Calomel, in the form common in England and all countries under Western civilization, is now extensively used and is even manufactured in Japan, under the name of *kankō*. But mercurous chloride is also largely used there under the name of "light powder," *keifun* (Chinese, *kingfun*), in another and very much older form, which is of signal purity, and made by a simple process as yet quite unknown in Europe. I witnessed this interesting process from beginning to end some years ago, and now make this publication of it to the Society, with full permission of the proprietor of the works I visited, Mr. H. Kokubu, who has aided me in every way he could, and notably with drawings, some of which illustrate this paper.

*Historical.*—According to Terajima Kokyō and Ono Ranzan, writers who lived in the last century, the first-named perhaps a little earlier, calomel was known in Japan as far back, at least, as the

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<sup>1</sup> Journal of the Society of Chemical Industry, 13, 108.

beginning of the eighth century, having then been presented to the Empress Genmiyo; but their authority is the *Zoku Nihongi*, reference to which Professor Haga, F.C.S., informs me makes it clear that mercury itself, not its chloride, was the thing presented.

In the time of the writers above named, mercurous chloride was well known and was manufactured in Japan, not only at Isawa, a village in Isé, where it is still made, but also in the city of Osaka and in a town near it, called Sakai. Mr. H. Kokubu, manufacturer, tells me that records exist at Isawamura of his family having carried on the manufacture of *keifun* there for the last three hundred years.

Far earlier, namely, in the tenth century, Minamoto-no-Shitagō, in his work entitled *Wamiyo-Ruijūsho*, makes mention of a mercurial preparation named *kōfun* or "powder of mercury." It is, however, questionable whether this was mercurous chloride or mercuric oxide, and therefore whether calomel was known or not at this time. But since calomel, under the name of *keifun*, is mentioned by Chinese writers even earlier than this, it may be safely accepted that Japanese knowledge of this body is older than ours in Europe. The Western knowledge of chloride of mercury dates from the first half of the sixteenth century, but the distinction between calomel and corrosive sublimate was not recognized till near the end of that century.

*Literary.*—The literature on Japanese calomel is meagre. Japanese writers of the old school have contented themselves for the most part with translating Chinese writings. Ono Ranzan mentions that the Japanese method differs from the Chinese, in making use of water in place of alum and other chemicals, in which he came near the truth. The late Dr. Geerts, a Dutch pharmacist, who in the Government service did much in establishing Western pharmacy in Japan, treated of *keifun* in some metallurgical contributions he made to the *Transactions of the Asiatic Society of Japan*. What he wrote is contained in Vol. IV (1875), and consists of information almost exclusively about Chinese calomel, and derived more from Chinese and Japanese writings than from any experience of his own. Concerning Chinese calomel English readers have the *Notes on Chinese Materia Medica*, among the "Science Papers" by the late Daniel Hanbury, F.R.S., edited by J. Ince. Hanbury mentions, as the result of his own observation, the characters of *kingfun* and its great purity but for the presence of minute, transparent, acicular

crystals of calcium sulphate. He refers to Porter Smith's *Contributions towards the Materia Medica and Natural History of China* for an account of the manufacture. Smith, however, takes his information solely from Pearson's account on p. 59, Vol. III. of Sir J. Davis's work *On the Chinese*. I have not seen this book but it is clear from Porter Smith that Pearson again has only derived his information from the Chinese *Materia Medica*, *Pun-tsaou-kang-muh*, and not from his own observation, and it amounts to this:—Common salt and mercury, of each 1 oz.; alum, 2 ozs., or salt, mercury, copperas, and saltpetre, in some such proportions are rubbed together and put into an iron bowl, which is then covered with a roomy earthen dish well luted down. This is exposed to the heat of a strong charcoal fire for four or five hours, when water is thrown on the cover and the cover taken off. On its inner surface the calomel is found adhering in the form of a beautiful, feathery, white sublimate. Ten parts of mercury are said to yield about eight parts of calomel. Dr. Geerts's paper, already referred to, contains essentially the same account, translated from the Japanese version of the Chinese work.

Lastly, there is a paper, in the Japanese language, on the manufacture of *keifun* at Isé, which is the forerunner of the present one. That paper appeared in 1887, in the *Journal of the Tōkyō Chemical Society*, written by Mr. T. Shimidzu, M.E., F.C.S., my former pupil and colleague, and it was his description to me of what he had seen that led to my own visit to Isé in company with Professor Haga in the following year. In one or two points I have availed myself of this paper to make my own account more complete.

*Of the Specific Properties of Keifun.*—*Keifun* is in very thin, minute scales, lustrous, transparent and white or faintly cream-colored. It might be described as micaceous calomel. To the touch it is soft and smooth. Measured in bulk, dry, it is four times as voluminous, more or less, as the ground calomel prepared by the European process, and can be readily scattered by a puff of the breath. Rubbed hard in a porcelain mortar, it gives the brown resinous streak characteristic of calomel, and the evidence, therefore, according to pharmaceutical authorities, of its freedom from corrosive sublimate. Exposed to bright sunlight, it gradually assumes a light brown color; a color, that is, having no affinity to gray or black. Moisture does not seem to favor this change, which is certainly not

owing to any reduction to metal. European calomel suffers a similar change. *Keifun* is free from corrosive sublimate and from metallic mercury.

Hanbury found selenite in Chinese calomel, and Geerts found calomel of this form generally adulterated with selenite and mica; but whether what he examined was ever Japanese and not always imported Chinese calomel he does not show. I have found *keifun* as it came direct from Isé quite free from adulteration, and have not met with any adulterated.

*Of the Materials Used in Making Calomel in Isé, Japan.*—The materials for making Japanese calomel are: mercury, an arenaceous, red clayey earth, bay-salt, bittern or salt mothers, and air. The mercury is imported from Europe, but in old times it is said to have been found in the neighborhood of Isé, as cinnabar.

The earth, called *mitsuchi* ("seed-earth"), is all taken from a neighboring hill, Shunakayama, and, according to Mr. Kokubu, many other clays have been tried in place of it, always with bad results. It is of a rather light-brown red color, which changes to a duller and somewhat brown red on drying and gently heating the earth, and to a light ordinary brick red by a strong heat. As mined, the earth is seen to consist largely of colorless quartz grains. Besides the quartz a very little biotite is seen sparkling through it. The fresh, damp earth does not form a compact mass, but a slightly cohering aggregate of damp crumbs. This texture appears to be due to the earth being a mass of quartz in small grains, from the size of a hempseed down to that of impalpable particles held together by plastic clay. For use, that which does not contain coarse quartz grains too abundantly is selected, and is made into briquettes and moderately baked on the hearth of the fire-place under the calomel pots. These briquettes are then as light and porous as the prepared porous clay used in Fletcher's gas-furnaces. The raw earth, air-dried, is readily rubbed into its constituents by the fingers; and the baked briquettes very easily and rapidly reduced to a soft powder, quartz grains and all, in the agate mortar. The larger grains of quartz in the raw earth are also very brittle. I have treated thus fully of the mechanical characters of the earth, because probably much of its efficiency is due to them; but its chemical character also calls for notice. As baked ready for use, it contains in the thoroughly air-dry condition still 5 per cent. and more of water. Before ignition

it is almost entirely decomposed by sulphuric acid, either in some days in the cold or quickly by heat. It is also largely acted upon by hot hydrochloric acid; and, heated in sealed tubes with this acid to  $120^{\circ}$ – $150^{\circ}$ , it is almost as fully decomposed as by sulphuric acid. It contains practically no silica soluble in hot sodium carbonate solution, but after acid treatment yields, of course, much silica to this reagent. The composition of the earth, as found in use at the works, but rendered anhydrous, is as follows:

Quartz, . . . . .	38.4
Combined silica, . . . . .	24.2
Alumina, . . . . .	26.3
Ferric oxide, . . . . .	10.5
Magnesia, . . . . .	0.3
	<hr/>
	99.7

The magnesia is only got by fusion of the finely-ground earth with alkali carbonate, and belongs to the particles of mica scattered through it. Only doubtful traces of phosphoric acid could be found, and, what is specially to be noted, no lime whatever. The earth is thus nothing but quartz, kaolin, ferric hydroxide, and a very little biotite, and is probably valuable to the calomel maker, not only for its highly porous texture, but also for its negative chemical qualities.

The bittern and even the rough bay-salt contain magnesium chloride, and this rather than sodium chloride must be the source of hydrochloric acid in the process. That air finds a graduated entrance to the other materials by diffusion during the process, will become evident from a consideration of the set-up of the apparatus,

*Of the Plant.*—The apparatus for making Japanese calomel consists of a table-furnace supporting 60 cast-iron pots lined and surmounted with the Shunakayama earth or *mitsuchi*, on which rest, as covers and condensers and receivers of the calomel, unglazed clay cups, bottom upwards.

In *Fig. 1* the furnace as it is when in action is seen from the working side; 10 pots on the left side are shown still to be charged and covered. The wooden step in front is to enable the workmen to reach over the table easily when charging the pots or emptying them. In *Fig. 2* the furnace is seen from the back or firing side, and with the walls broken away to show its interior and the method

of firing. In *Fig. 3* the mounting of the pots is shown in three stages by sectional plans of the table.

On a smoothed clay hearth the walls of the furnace are raised in clay, building in the three stones which frame the stoke-hole (*Fig. 3*). The walls are 2.6 feet high and the enclosure is 7.6 feet by 4.7 feet, measured outside. The stoke-hole is 1 foot by 1 foot, but a little wider than this at the base, and is without door. The table of pots and roof of the furnace is constructed (*Figs. 1 and 3*) by laying a square iron rod on each of the long walls, and on these 11 cross rods, also square, on which are to rest the flanges of the pots. The pots are then put in position as close together as possible, hanging

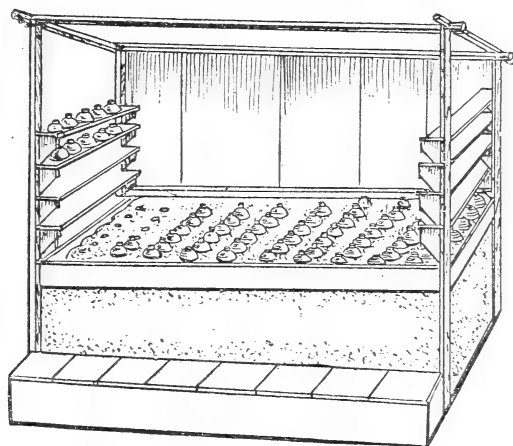


FIG. 1.

by their flanges, in 10 rows of six each, and plastic clay pressed into the openings left between the flanges and the roots, and the roots and flanges covered in so that only the mouths of the pots remain visible, as shown by the middle rows in *Fig. 3*. The furnace clay being thoroughly dry, it is deeply laid over with the red earth mixed with a little bay-salt and moistened with bittern in small quantity. The pots are also filled with the same moist red earth, except in a central cylindrical shaft (see the left side of the furnace-table in *Fig. 1* or the right side in *Fig. 3*), reaching to the bottom of the pot which is left bare. The pot is 0.5 feet deep inside, and across its mouth, inside, is 0.45 feet. It is shown in *Fig. 4*. The shaft or cavity left in the filling is 0.18 feet in diameter, and is shaped by resting a wooden core on the bottom of the empty pot, and then

pressing in the moist earth round it, smoothing off the top, and dropping a perforated board over the projecting core to hold down the earth while withdrawing the core, which is then removed by its handle. The furnace is now ready for work. It should have been

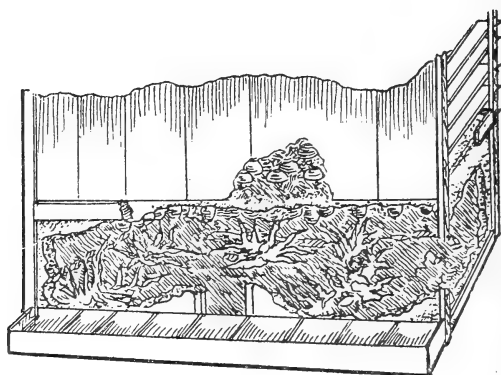


FIG. 2.

mentioned that after the clay walls of the furnace are built they are framed in with wood to increase their stability and to give support to a wooden back and to shelving above the table, as seen in *Fig. 1*.

*Of the Firing.*—The firing the pots is kept far below what are

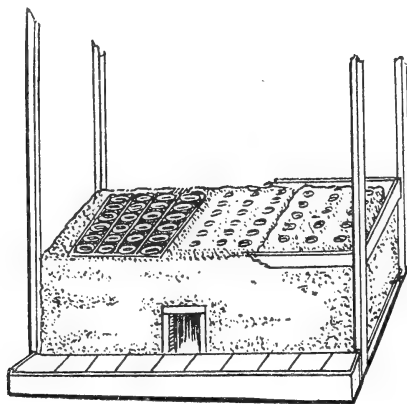


FIG. 3.

usually regarded as furnace heats. The fuel employed is wood, and the Japanese are clever in the use of this economically and effectively in firing pots, for boiling, evaporating, distilling or subliming. The method of heating is seen in *Fig. 2*. Five lengths of firewood are



ranged along the back and front walls on the hearth, generally raised at one end by resting on a lump of clay. In the ordinary working of the furnace, as I saw it, the heat from previous work is sufficient to kindle the fresh wood. The flames rise up the sides and run over the bottoms of the pots, leaving the central space in the chamber free from flame. The air enters by the lower part of the stoke-hole and the products of combustion escape invisible by its upper part, so perfect is the combustion. At the time of first light-

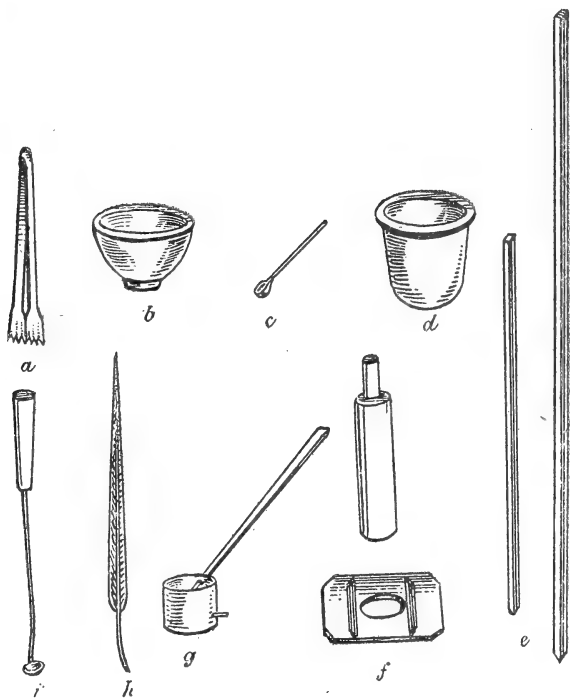


FIG. 4.

- a. Tongs for lifting and dropping the lumps of wet compost into the pots.
- b. Clay cup condenser.
- c. Brass mercury spoon.
- d. Iron heating pot.
- e. Rectangular iron bars for pots.
- f. Wooden core and board for lining pots.
- g. Bamboo water pot for wetting furnace top.
- h. Quill feather for emptying cups.
- i. Peel for lifting compost ball out of pot.

ing the fire, and of irregularities in stoking, some smoke is unavoidable, and to keep the top and table free from this smoke and from

ashes, a wooden back is put in above the table, as shown in the Figures. There is also a wooden hood and flue above the stoke-hole to carry off any smoke; this is not shown in the Figures, but is similar to those put up in England and elsewhere over the working doors of furnaces to protect the workman from arsenic, sulphur, or other noxious fumes. The heating is so well effected that the pots, two feet above the burning logs, are made sufficiently hot, barely red-hot at the bottom, and yet the wooden frame on the outside of the furnace is not charred, and the workroom is not unpleasantly warm.

About three bundles, or 40 pounds, of wood serve for one firing, and it is remarkable to see so little fuel working so many pots.

*Of the Working.*—A compost of burnt *mitsuchi* with about a fourth of its weight of bay-salt is made up with bittern into lumps the size of large chestnuts.

The furnace being hot enough, the *mitsuchi* surface of the table is once for all freely wetted by a watering-pot, perhaps half a gallon of water being used, all of which is absorbed; a lump or two of compost is dropped, by tongs or by hand, into each pot in rapid succession, a very small spoonful of mercury poured into each pot, the total charge for the 60 pots being somewhat less than one pound avoirdupois (more exactly five-sixths of a pound), and a clay cup, bottom up, placed over each pot and adjusted by gently pressing and turning it round slightly. The cup is thus made to fit neatly on the earthen top without adhering to it in the least. The cups are thick and unglazed, but become very smooth inside by use. They have an inside diameter at the mouth of six inches and a depth of three inches.

Thus arranged, the pots and cups are left for three hours, and during the latter part of this time the furnace is cooling. When cool enough each cup is lifted in turn, and with two turns of a feather, the *keifun* or calomel, which fills it in the form of a sparkling network of delicate crystalline scales, is transferred to a sheet of paper held under it, and the cup, mouth downwards, placed on a shelf of the furnace ready for use in the next operation.

The calomel, it will thus be seen, forms no adherent cake in the cup, but particles only loosely hanging together. So obtained, it is ready for the market, needing only to be packed in small wooden boxes for sale.

The spent lumps of earth and salt are lifted out of the pots by the tool shown in *Fig. 4*, and when the furnace has become still cooler, the fire is made up again, the furnace top freely wetted, and a new operation set going as before. The furnace is worked twice each day. Nothing could well be carried out with greater simplicity and less expenditure of labor and time.

*Of the Yield*—The loss, I am told, is about 16 per cent. of the theoretical amount of calomel, which is, I believe, about twice as much as is lost in the Western process.

*Experimental.*—If one of the cups is removed a few minutes after the operation has been started, much of the mercury is found in it as a sublimate of fine globules, mixed with only a little almost amorphous calomel, from which it would appear that the formation of the calomel results from reaction in the cup between the mercury in vapor and the active gases.

On dipping into the pot, uncovered during the process, a glass rod with a drop of water hanging to it and then withdrawing it, and testing the remainder of the water with potassium iodide and starch, no chlorine can thus be detected. The same is true when a drop of solution of potassium hydroxide is used. Nor can the slightest odor of chlorine be detected in the vapors issuing from the uncovered pot.

On passing air, containing a little hydrochloric acid gas, through a tube in which mercury is freely boiling, sparkling calomel is formed close to and mixed up with the mercury.

Red earth which has been used in the process turns moist, red litmus paper blue, while fresh red earth is neutral.

*Theoretical.*—The nature of the materials used and the observations gained by the preceding experiments are sufficient to establish that the calomel is formed by a reaction between mercury vapor, oxygen and hydrochloric acid gas, in which, along with mercurous chloride, water is formed— $4\text{Hg} + 4\text{HCl} + \text{O}_2 = 4\text{HgCl} + 2\text{H}_2\text{O}$ , and that the formation takes place at a temperature near—above or below—the boiling-point of mercury, and much below that at which calomel freely volatilizes. The source of the hydrochloric acid is certainly the magnesium chloride of the bittern and bay-salt which, heated in a moist atmosphere, even in the presence of sodium chloride, is, as is well known, partly converted into magnesia and hydrochloric acid. Hence the alkalinity of used *mitsuchi*.

The porosity of the walls of the apparatus, particularly of the layer of *mitsuchi* on which the clay cup rests, must be more than sufficient to allow enough air to enter during the working. I had supposed that the hot hydrochloric acid and air might, in contact with the earth, have yielded a little chlorine, but the temperature reached in the process normally worked seems never to reach that required for the liberation of chlorine.

The Chinese process, *if correctly described*, differs from that used in Japan in several material points, one of which is that the mercury is intimately ground up with the other materials, and one fails to see what reaction can take place between it and the two others, namely, salt and alum. Heated, the mixture must give off mercury and hydrochloric acid, and then these, as in the Japanese process, will, with air, give the calomel, but this is independent of the previous intimate mixture of the mercury with the salt and the alum. Another point is that in place of the magnesium chloride of sea water as the source of hydrochloric acid, the Chinese are said to use alum or copperas, which, with the salt, will react to give hydrochloric acid. A third point is that the cover is said to be closely luted to the iron pot, which must nearly exclude the air, without which it is impossible to explain the formation of the calomel. Perhaps this is the reason why the Chinese process is said to take four or five hours' firing, since this may give time enough for the needed oxygen to diffuse through the cup and luting, it will also account for the fact, if it is one, that the yield of calomel is markedly less in weight than the mercury used. Again, there are to be noticed the statements that the iron pot is exposed for hours to the strong heat of a charcoal fire, and that the hot clay cover is cooled by throwing cold water on it, statements which must be regarded as greatly exaggerated if not erroneous. Lastly, the calomel-giving vapors are allowed to remain in contact with the hot iron of the pot, instead of being kept from it by the thick lining of earth provided in the Japanese process, a contact which such vapors could not stand without destruction. I think, therefore, that we may be fairly doubtful whether any reliable description has yet been given concerning the Chinese process, which we may expect to find to differ little, if at all, from the Japanese process, except in salt and alum being used in place of the mother-liquor of sea-salt or "water," as Ono Ranzan supposed it to be.

One thing to which attention may be called is that the Chinese are stated to add some nitre to a similar mixture when employed to give corrosive sublimate. For that being the case, it is seen that free chlorine which would here be developed from the salt, nitre and alum, is necessary for the production of the higher chloride, and that air and hydrochloric acid can only yield the lower chloride, a difference of much theoretical interest, and indeed of practical moment also. It is known that re-sublimation of calomel generates some corrosive sublimate, and, although authorities are not quite agreed as to whether reaction occurs between gold leaf and calomel vapor, it is hardly to be doubted that such reaction does occur. Now I have found that if in the Japanese apparatus the temperature of the cover be raised sufficiently to volatilize much of the calomel the remaining calomel is no longer free from corrosive sublimate. It must, therefore, be borne in mind that the calomel formed in the Japanese process is not, and cannot be, the result of true sublimation, but of precipitation as fast as formed from the three gaseous bodies which give rise to it. At the temperature at which mercury boils, calomel is either quite fixed or, at most, has a vapor of exceedingly small tension. In the two facts, that the three gases do not react to yield corrosive sublimate and that the calomel is not heated to its volatilizing point, lie the explanation and, at the same time, the assurance that Japanese (and Chinese) calomel contains no corrosive sublimate.

*Summary.*—The Japanese prepare calomel pure, above all things free from corrosive sublimate. They heat balls of porous earth and salt soaked in bittern along with mercury, in iron pots lined with earth. The heat forms hydrochloric acid from the magnesium chloride in the bittern, and the mercury sublimes into the closely-fitting but unattached clay covers of the pots. Air enters by diffusion and oxygen and hydrochloric acid gas act together in the hollow cover on the vapor given off from the sublimate of mercury there formed. The cover thus becomes filled with a network of micaceous particles of calomel, precipitated at a temperature below its subliming point at the moment of its formation.

This investigation of an interesting product of Japanese industry has been carried out under the authority of the Imperial University of Japan. I cannot acknowledge fully enough the indispensable assistance I have received from my colleague, Assistant-Professor Haga, F.C.S.

## RECENT CONTRIBUTIONS TO PHARMACY.

*Observations of a Pharmacognosist in England.*—Under the above caption Prof. Henry H. Rusby delivered recently a very interesting address before the Alumni Association of the New York College of Pharmacy, (*Alumni Journal*, 1894, 49). After expressing his appreciation of the privileges extended to him of working on the Kew Herbarium, he records certain conclusions relative to *Cinchona Calisaya* which are sure to excite comment. Premising his conclusions with the statement that his attempts to determine certain Bolivian forms of *Cinchona* had resulted somewhat unsatisfactorily in the past, and that there seemed to be a clear discrepancy between his results and the current determinations of different species, he expresses the belief that the Kew specimens of *Cinchona Calisaya* are all wrongly named, notwithstanding the fact that the correctness of this conclusion involves the wrong naming of millions of trees at all the centres of *Cinchona* cultivation outside of America, at the time that those localities contributed their specimens to Kew.

In arriving at this conclusion, Prof. Rusby was governed by a specimen of *Cinchona Calisaya*, shown him, while in London, by Mr. Howard, a grandson of the famous quinologist. The specimen examined was an original one from which Mr. Weddell had drawn up his description of *Cinchona Calisaya*. It was exactly as Prof. Rusby had pictured it, and corresponded with not more than three or four of the entire collection of specimens so named at Kew. Therefore he emphatically states that the plant called *Cinchona Calisaya* var. *Josephiana* has been enormously cultivated and distributed to herbaria under the name of *Cinchona Calisaya*. He further says that if the plant were in reality a variety of the species to which it is accredited, the error would be less grave; but it is, in all essential characters, and particularly in its economic aspects, as distinct from *Cinchona Calisaya* as it well could be.

Certain other statements are also of especial interest: Rhaponticum or spurious rhubarb is largely grown in England, and the belief is expressed that an important branch of the business is in the shipping of this article to American ports.

Carthagena ipecac is supposed to be rigidly excluded from our market, yet it is stated that very direct and definite evidence exists that a regular business exists in London of "picking over the Carthagena ipecac, selecting certain roots, breaking off certain

parts of them, when necessary, and staining the suitable portions in imitation of the Rio variety, for the purpose of evading our custom house officers."

Senna pods are now sold in the London markets, and, contrary to the old belief, they have been found to have the same properties, and to be probably little, if any, inferior to Senna leaves.

Wild mace, a product of *Myristica Malabarica*, and almost entirely devoid of aromatic properties, is largely sold; for what use, it is not stated.

In conclusion, Prof. Rusby refers to a visit to the famous Meacham Drug Farms. The soil is chalky, which is believed to favor the development of volatile oils in plants. Large fields of peppermint, thyme and chamomile were observed. The cultivators of the plants do not themselves do the distilling, which is a separate industry. In some cases, the owners of the stills purchase the crop from the farmers, and distil it in their own interest, but ordinarily the crop is brought to them by the owners, and distilled for a toll or fee, and the product returned to them after distillation by the owner of the still.

J. W. ENGLAND.

*Recent Contributions to the Knowledge of Scyll.*—This bulb has repeatedly been the subject of investigation, but without definitely ascertaining the several, especially the active, constituents. The older literature embraces investigations of Vogel, Lebourdais, Landerer, Bley, Wittstein, Tilloy, Mandet and Schroff, which contain so many contradictory statements that their results must have little importance. In 1878 there were prepared in Merck's laboratory three substances, concerning which only meagre statements are made: Scillipicrin, scillitoxin and scillin, the last of which was in crystalline form; according to C. Möller, the first two were proven to be heart poisons.

E. von Jarmerstedt published the first process for isolating the bitter principle: The dried red scales were digested with water on a water-bath for one to two days, the dark-brown colored decoction having an acid reaction and a very bitter taste, evaporated on a water-bath to a small volume, mixed with subacetate of lead, until the supernatant liquid gave but a slight precipitate, the latter collected on a filter and washed with hot water; the filtrate was freed from lead by the addition of dilute sulphuric acid and filtration,

neutralized with ammonia, concentrated on a water-bath, and the active constituent precipitated from neutral or faintly acid solution by an aqueous solution of tannin. The precipitate was allowed to subside, the supernatant liquid carefully decanted, and the precipitate collected on a filter; owing to the solubility of the precipitate, the excess of mother-liquor had to be removed by pressing between bibulous paper; to liberate the bitter principle the dried precipitate was treated with absolute alcohol, filtered, the filtrate mixed with zinc oxide and a little water, evaporated to dryness on a water-bath, the residue extracted again with absolute alcohol and this solution evaporated to dryness. The more or less red colored, intensely bitter residue formed a tough, sticky mass which, immersed in water, became hard and pulverizable; to remove coloring matter the powder was mixed with animal charcoal, washed repeatedly with water, and after drying the charcoal at a moderate temperature, extracting the bitter principle with absolute alcohol.

Schmiedeberg refers to this investigation and places *scillain* in the pharmacological group containing digitalin. In addition to this bitter principle there is present among other constituents a mucilage which Schmiedeberg named *sinistrin*; it is prepared by making an aqueous infusion, adding lead subacetate until precipitation ceases, filtering, removing excess of lead, precipitating *sinistrin* with milk of lime, washing the precipitate, decomposing it with carbon dioxide and precipitating the *sinistrin* by the addition of alcohol; chemical properties and percentage composition place *sinistrin* in the group with dextrin, differing from this, however, by being laevorotatory and in yielding by hydrolysis chiefly *lævulose* presumably with another optically inactive sugar.

A. Weyher von Reidemeister prepares *sinistrin* by macerating powdered squill with water, keeping the mixture neutral by addition of baryta; after several hours an excess of lead subacetate is added, the mixture allowed to stand until the supernatant liquid becomes clear, then filtered and the excess of lead removed by the use of hydrogen sulphide, filtered, the filtrate neutralized with sodium hydrate and decolorized by the aid of animal charcoal; the filtrate is evaporated at a temperature below 40° C., the syrupy residue mixed with alcohol, which precipitates both *sinistrin* and fruit sugar, and set aside for two days. The precipitate is dissolved in twice its weight of water, the solution mixed with an excess of baryta, which



removes the greater portion of the sugar, while the decanted liquid, upon the addition of alcohol, separates the barium compound of sinistrin, which is washed with absolute alcohol, powdered and dried over sulphuric acid in vacuo; by repeated solution in water and precipitation with alcohol this compound is gotten so that it will no longer reduce Fehling's solution; it is then dissolved in three times its weight of water, the solution warmed, the barium precipitated by carbon dioxide, the filtrate concentrated on a water-bath and alcohol added. The sinistrin which is precipitated is dried and purified like its barium compound. It is possible to obtain a product by this process which yields upon ignition only one and one-half per cent. ash. Unable in itself to reduce alkaline copper tartrate solutions, solutions of sinistrin, through the influence of rapidly appearing bacteria, soon possess this property. Heated with nitric acid of sp. gr. 1.12 it yields oxalic acid, but no mucic, saccharic or tartaric acid; yeast only slowly induces fermentation.

Riche and Remont have also described sinistrin under the name of scillin, and obtained it by the expression of fresh squill, which they claim contains more scillin (sinistrin) than the dried bulbs; they obtained from fresh squill (containing about 75 per cent. water) almost 30 per cent., calculated to perfectly dry squill. The expressed juice was neutralized with chalk and evaporated under reduced pressure, to syrupy consistence; by the addition of an equal volume of alcohol they separated mucilage, and in the clear decanted liquid the addition of six volumes of alcohol precipitated the sinistrin, which was freed from sugar and inorganic salts by repeatedly dissolving in water and precipitating with alcohol; so purified, it did not yield mucic acid by boiling with nitric acid.

Franz Kurtz, in a recent inaugural dissertation, presented to the university at Erlangen, makes an investigation of the bitter principle scillain and the carbohydrates. In a study of von Jarmerstedt's method of extracting the bitter principle from both fresh and dried bulbs, mention is made of the relatively small yield; the difficulty of extracting the tannin compound of the bitter principle with alcohol because this is so tenacious that it cannot be powdered; and the prolonged exposure of the bitter principle to numerous reagents. To determine the most suitable solvent for the bitter principle, extractions were made with distilled water, hot 90 per cent. alcohol and ether; alcohol proved the best solvent, also extracting but traces of

inorganic substances; the hot alcoholic extraction of the dried bulb upon cooling deposited a substance to be mentioned later. The aqueous extraction contained no volatile acids, but oxalic, malic and citric acids were identified.

For the preparation of the bitter principle the alcoholic extract from 25 kilos. of squill was taken; the precipitate obtained in the cooling of the alcoholic extraction was collected separately. The alcoholic extract was dissolved in water and the solution heated for two days in a water-bath with elutriated lead oxide; after filtering and washing the dissolved lead was precipitated as sulphide, the excess of hydrogen sulphide removed by heat and the bitter principle removed by digestion with animal charcoal; the charcoal was collected on a filter, washed with water until the washings ceased to affect Fehling's solution, and the bitter principle dissolved out again by repeatedly boiling with absolute alcohol. The evaporation of the alcohol left a yellowish-brown residue; this by oft-repeated treatment with charcoal was finally obtained as a pale yellow, amorphous mass which, by all-known methods of solution and evaporation, could not be obtained in a crystalline form; kept *in vacuo* under phosphoric oxide it hardened and then broke with a vitreous fracture. The principle, scillain, so obtained is readily soluble in water and alcohol, especially when heated, but is difficultly soluble in ether; it has an intensely bitter taste, neutral reaction and has no effect upon alkaloidal reagents; it is free from nitrogen, not yielding a cyanide when heated with a metal, like sodium, nor yielding ammonia when heated with soda-lime. Dried to constant weight under reduced pressure and in the presence of phosphoric oxide, it has the composition C 53.80 per cent., H 7.305 per cent., O (by difference) 38.895 per cent., which, expressed in simplest proportion, would give the formula  $C_6H_{10}O_3$ . A concentrated aqueous solution was decomposed by warming with dilute sulphuric acid and then the solution distilled in an atmosphere of carbon dioxide by the use of steam heat; the distillate was only slightly opalescent, had an acid reaction and an agreeable odor; no test for furfurol with anilin acetate was obtainable. The distillate neutralized with sodium carbonate was agitated with ether and the two solutions separated; the ethereal solution had an agreeable odor, and upon the distillation of the ether and spontaneous evaporation of the last portions, left a neutral, pale yellow liquid, changing upon exposure

to the atmosphere; it gave no reaction with ferric chloride nor for aldehydes. Dehydrated by treatment with anhydrous copper sulphate and calcium chloride and fractionally distilled, it boiled constantly at  $83^{\circ}$  C.; odor and boiling point indicate *isopropyl alcohol*. The neutralized distillate after extraction with ether was evaporated to dryness; one of the lower organic acids was indicated by a slight charring; formic and acetic acids were not detected, but the following tests for butyric acid were obtained: Odor, formation of the ethyl ester, formation of barium butyrate by acidifying with phosphoric acid, distilling and neutralizing the distillate with barium carbonate, and estimation of barium in this salt.

The acid solution left in the retort after removing butyric acid and isopropyl alcohol by distillation had lost entirely the bitter taste; agitation with ether removed nothing from this solution. To get rid of the sulphuric acid an excess of washed barium carbonate was added, filtered, and the filtrate decolorized with animal charcoal. This solution, which reduced Fehling's solution, was evaporated to dryness and the residue boiled with methyl alcohol, filtered, and the filtrate mixed with ether; there was formed a white flocculent precipitate which dissolved in water, was dextrogyre, fermentable and gave a crystallizable compound with phenyl-hydrazine melting at  $205^{\circ}$  C.; it had a reducing value of 0.634 Cu for one gram substance and by oxidation yielded only oxalic acid. This bitter principle, therefore, is a glucoside decomposing into *dextrose*, *butyric acid* and *isopropyl alcohol*.

The bitter principle oxidized by heating on a water-bath an aqueous solution with potassium bichromate and sulphuric acid and distilling in a current of steam gave but one recognizable product, butyric acid; the green-colored liquid left in the retort, after cooling, was agitated with ether, but the latter upon evaporation left no residue.

The substance separating in the cooling of the hot alcohol extraction of the bulb is described as a dark-brown, tough, glutinous mass, readily soluble in water, but now only partly soluble in alcohol; it was boiled, using a reflux condenser, for several days with 90 per cent. alcohol, whereby the color was much improved but only partial solution was effected; after filtering, the alcohol was largely recovered by distillation, the residual liquid mixed with water, the solution first decolorized by animal charcoal, then evaporated to dryness and the sweet residue boiled with methyl alcohol. The addi-

tion of ether to this methyl alcohol solution gave a white flocculent precipitate which purified by solution and reprecipitation had the same properties (excepting the reducing value which equalled 0.649 gm. Cu) as described under one of the decomposition products of the bitter principle; this body is one of the glucose group and most probably dextrose.

The portion of the substance insoluble in methyl alcohol was easily soluble in water, the solution having the following properties: No change with iodine or Fehling's solution; it turned the plane of polarization to the left; by the action of diastase a reducing sugar was produced. Dried at 90° C, the finely powdered substance had the composition: C 44.265 per cent., H 6.175 per cent., O (by difference) 49.56 per cent., agreeing to the formula  $C_6H_{10}O_5$  or a multiple of this. By prolonged heating with dilute hydrochloric acid on a water-bath laevulinic acid is produced along with humic substances; by oxidation with nitric acid either saccharic or oxalic acid can be obtained dependent upon the strength of the nitric acid. To determine if the molecule contained representatives of other related carbohydrate groups, tests were applied for laevulose, galactose and xylose, but with negative results. This investigation of the precipitate obtained from the hot alcohol extraction of squill establishes the presence of two carbohydrates, one of which is dextrose, the other is a member of the group  $C_6H_{10}O_5$ .

FRANK X. MOERK.

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*Lanolin* may be identified by the following test, which may also serve to indicate the purity of the sample: 0.1 gm. lanolin incorporated with 10 cc. concentrated sulphuric acid gives an intensely red liquid with a greenish fluorescence, the depth of color depending upon the purity of the lanolin; if 10 cc. chloroform be added to the above, agitated and allowed to separate, the chloroform layer will have a bright red color, while at the line of contact of the two liquids a black line will be noticeable; these results by comparison with pure lanolin will indicate the purity of the sample examined.—Astolfi (Boll. et. Chim. Farm.) Apotheker Ztg., 1894, 94.

## EDITORIAL.

The April number of the Journal was issued so soon after the election of the present editor and publishing committee, that it was not possible to make any statement regarding the future policy of the new management.

It may now be briefly stated that the standard which brought the Journal to be the chief exponent of the scientific and professional side of pharmacy in America will not be lowered.

The editor has sought and received much sound advice from various parts of the country. The universal expression has been against any change in the dignity and scientific tone which has heretofore characterized this Journal.

With such advice before us, we are led to approach a delicate subject, and say that a large and eminently respectable element in the pharmaceutical profession does not consider that the American Journal of Pharmacy has any competitor. It occupies an otherwise sadly neglected field in the pharmacy of our country, and the effort will continue to be made to educate pharmacists to its standard, rather than lower the Journal to compete in an already overcrowded territory.

The American Journal of Pharmacy will be what the results of original work and thought from the more scientific of our profession make it. An effort will be made to largely fill its pages with original communications; after that, we propose to give brief reviews of the most recent results published elsewhere in this country and abroad.

All the most important books relating to pharmacy will be reviewed or noticed. Finally, the editor will seek some material for editorials from sources other than his own pen, hoping, thereby, to keep those few pages constantly alive and interesting.

While this Journal has a history extending back to 1825, it does not have to lean on that history for support; but the policy which gave it that history; which has placed it in many of the scientific libraries of Europe; which to-day gives it subscribers and readers in every civilized quarter of the globe, is the policy which the present management will endeavor not to deviate far from.

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The first paper in this issue is a direct communication from its author, in response to a suggestion of the editor. It is hoped that this will be followed by further contributions from other honorary and corresponding members of the College.

Not only is the paper valuable in itself, but it is a hint to our readers in this country that we have thousands of indigenous plants with a local history and reputation; and some account of them, as outlined in Mr. Hooper's paper, on *Myrica Nagi*, would be of present interest, as well as of lasting value in advancing pharmaceutical knowledge.

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*The Martindale Herbarium.*—At the meeting of the Board of Trustees of the Philadelphia College of Pharmacy, held on Tuesday afternoon, April 3d, Mr. Howard B. French, on behalf of himself and Messrs. Smith, Kline & French Company, presented to the College the entire herbarium of the late Isaac C. Martindale, of Camden, N. J., which they had recently purchased from the estate.

The chairman, Mr. T. Morris Perot, expressed the gratification of the Board

at receiving so unexpectedly such a valuable addition to the collections of the College, and accepted the same on behalf of the Board.

It is peculiarly appropriate that this superb collection of plants should be permanently located in one of the foremost educational institutes of Mr. Martindale's native city. While in recent years his attention had been largely directed to entomology, making the *Lepidoptera* a special study, the natural bent of his mind was the study of plants. Botany engaged his mind from his youth and gave him that scientific education and acquaintance with scientists which proved so valuable to him in his subsequent work.

Commencing his study of plants at the time that systematic botany alone seemed to engage almost the entire attention of botanists, his enthusiastic collections soon secured him an acquaintance with the recognized botanical authorities.

His early attempt at the preparation of an herbarium is represented by a mostly local collection mounted on sheets of paper and bound in a series of volumes. These will be preserved for their historical interest.

The present herbarium was commenced in his early manhood, and its collection and arrangement occupied at least 25 years. During a great portion of this time he enjoyed the friendship and assistance in this work of Charles F. Parker. It will always be recognized as Mr. Martindale's life work.

This collection consists of seven large walnut cases compactly filled with mounted specimens. It is impossible to form any definite idea of the number of plants contained, as on many of the sheets several specimens are attached from different localities.

Nearly every species is represented by a number of specimens from different sections of this country or from foreign countries, so as to fully represent the variations in the species.

These specimens are all handsomely mounted on white paper, and properly arranged in heavy manilla paper genus covers and in natural order divisions, the plan of arrangement adopted being that of Durand's index, corresponding with the nomenclature of the *Genera Plantarum* of Bentham and Hooker. The systematic arrangement and perfect order of this herbarium have always been admired by visiting botanists.

Every division of systematic botany is well represented. Not only the Phanerogamia or flowering plants, but the Pteridophyta, including a magnificent collection of ferns; the mosses and liverworts, and the Thallophyta are represented by a collection of algæ, fungi and lichens. It was the aim of Mr. Martindale to make his collection complete and a representative herbarium, and it is universally acknowledged as surpassing, both in numbers and in the perfection of style and arrangement, any private collection in America.

His proximity to and knowledge of the peculiar flora of the pine barrens of New Jersey gave him a fund of material valuable for exchanges, and he was not slow to take advantage of this in obtaining valuable specimens to complete his own collection. His correspondence and exchanges were numerous, including such countries as Canada, Brazil, England, France, Germany, Austria and Scandinavia, and the flora of these are represented in the herbarium. Mr. Martindale paid considerable attention to the peculiar and miscellaneous plants of the ballast grounds, and this class, difficult of study to the ordinary student,

because not contained in our local manuals and text books, is likewise well represented.

In addition to making extensive collections himself, and exchanging with numerous botanists both at home and abroad, he acquired by purchase the best collections offered. No collector submitted a list of desirable plants but that he was made happy by an order from Mr. Martindale, and he was a liberal contributor to every botanical expedition. Among the many noted American collectors whose collections are here represented may be mentioned: Parry, Garber, Lemmon, Rothrock, Rusby, Curtis, Howell, Reynolds, Palmer, and those magnificent collections made in the Southwestern States and Territories and in Mexico by C. G. Pringle.

In 1881 he purchased the herbarium of Dr. Ferdinand Rugel, of Tennessee, which was replete in the representation of the flora of the Southern States, thus receiving a large addition to his already extensive collections from this region. These specimens were remounted and distributed through his herbarium. A great part of the herbarium of his friend and co-laborer, Charles F. Parker, who had made a special study of the flora of New Jersey, is preserved in this collection. Likewise the collections of C. F. Austin.

No expense was spared to make his herbarium complete and perfect in every respect, and the outlay was large. It is estimated that in the collection and arrangement of this magnificent herbarium Mr. Martindale had spent at least \$15,000.

Beyond any statement of the money value of the herbarium, its true value will be in its importance to scientific study and future investigations. Mr. Martindale's studies brought him in contact with the botanical teachers and authorities, and numerous are the specimens bearing the labels of such eminent botanists as Dr. Asa Gray, John M. Coulter, Sereno Watson, Dr. N. L. Britton, Prof. E. L. Greene, Dr. Vasey, Prof. Macoun, Prof. Underwood, Dr. Porter and Wm. Canby.

The specimens and various genera or orders difficult of determination have been very generally submitted to specialists in these various departments, and their notes and references will add materially to the value of this collection. Many of the composites were examined and determined by Dr. Gray while preparing the volume of his Synoptical Flora of North America, covering that order.

The international reputation of this herbarium was such that monographers and students of special families of plants have eagerly availed themselves of the opportunity to consult it, and frequent are the references to its specimens in the published monographs.

In the catalogue of the plants of New Jersey, forming part of the geological survey of that State, Prof. N. L. Britton frequently refers to the herbarium of Mr. Martindale as authority for statements made.

From the above it will be seen that no just conception can be formed of its value as an authority and scientific work of reference.

It is the intention of the College to preserve the Martindale Herbarium intact as a reference herbarium, and under proper regulations it will be open to visiting botanists for study and consultation. It will thus serve alike to perpetuate the memory of a Philadelphia botanist and as a testimonial of gratitude

for such a generous gift to the donors—Howard B. French, Ph.G., and Smith, Kline & French Company.

G. M. B.

*The College Herbarium.*—In addition to the Martindale Herbarium, the College already possesses the collections of Elias Durand, Daniel B. Smith and Prof. John M. Maisch and numerous contributions from botanical friends and students. This collection is now undergoing thorough revision by the Committee on Herbarium.

With a laboratory equipped for botanical and microscopical study, and with such an excellent herbarium for comparison, the College will now be enabled to give a more extended course of botanical instruction than heretofore.

## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*Dictionary of the Active Principles of Plants.* Alkaloids, Bitter Principles, Glucosides; their sources, nature and chemical characteristics, with tabular summary, classification of reactions, and full botanical and general indexes. By Charles E. Sohn, F.I.C., F.C.S. London: Baillière, Tindall & Cox. Philadelphia: J. B. Lippincott Company. 1894. Pp. 194.

This work comprises, in a compact form, very valuable information concerning nearly six hundred plant principles; and, by abbreviating and classifying, the author has succeeded in getting into a moderate-sized volume a great deal that the pharmacist is constantly wishing to know.

No work, since the English translation of Dragendorff's Plant Analysis appeared ten years ago, comes so near supplying the demand for classified information concerning plant compounds as this does.

We may take *cocaine* as a random illustration; at a glance we see its botanical origin, and the geographical distribution of the plant from which it is obtained; the abbreviation "A" shows it to be an alkaloid; its chemical composition and compact formula are next given; then certain physical properties, as melting point and solubilities; finally, its behavior towards upward of twenty precipitants, and half as many more reagents which produce color tests. Every one having to do with the active principles of plants will find this book a constant assistant in the laboratory.

*Formulaire des Alcaloides et des Glucosides.* Par H. Bocquillon-Limousin. Avec une introduction par G. Hayem. Paris: J. B. Baillière et Fils. 1894. 16mo. Pp. viii et 313. Formulary of Alkaloids and Glucosides.

Three books of a series by the same author are now before us; two are reviewed at this time; the other—a Formulary on Antiseptics and Disinfectants—was noticed in this Journal, 1893, page 647.

All are useful works, but this volume on alkaloids and glucosides appears to especially comprise a large amount of valuable information, concentrated into a very small space. It is divided into three parts. (1) The Alkaloids; (2) the Glucosides; (3) the Bitter Principles and Neutral Bodies. Each class of compounds is first considered in a general way; that is, defined, the history given, classified, etc., and then the individual principles are taken up alphabetically.



The formula, when known, is first given, then the origin, method of preparation, description, reactions, therapeutic action, method of administration and dose, follow in order. Under "mode of administration" are noted a number of working formulas; for instance, with *aconitine* are given processes for making the solution, oleate, pill, ointment and tincture.

A very useful chapter is that on artificial alkaloids, beginning with *antipyrine* and ending with *trimethylamine*; much the same treatment is accorded these, that is given to the natural alkaloids.

The glucosides are described similarly to the alkaloids. While the existence of some individual members in both classes may at this time be questioned, yet, if a claim of their discovery has been made, perhaps one of the surest ways of getting more light on the subject is to introduce them into a list of this kind.

*Formulaire des Médicaments Nouveaux et des Médications Nouvelles. Pour 1894.* Par H. Bocquillon-Limousin. Introduction par le Dr. Huchard. Cinquième édition. Paris: J. B. Baillière et Fils. 1894. 16mo. Pp. 314. Formulary of New Remedies and Novel Medications for 1894. Fifth edition.

The characteristic features of this work are a number of brief but well-chosen descriptions of many of the newer synthetic compounds, and of some of our indigenous plants which are here used in domestic practice, but in France are considered rareties.

The most important additions to the fifth edition are: *Abrine*, *Agathine*, *Alumnoi*, *Antispasmine*, *Benzonaphthol*, *Betol*, *Cardine*, *Chloralose*, *Cresolal*, *Dulcine*, *Eucalyptol*, *Extracts of Animal Organs* (of which those from the brain, pancreas and testicles are examples), *Formalin*, *Gallanol*, *Gallobromal*, *Hydrastinine*, *Kola*, *Pental*, *Piperazine*, *Scopalamine*, *Salts of Strontium*, *Thiosinamine*, *Tolpyrpyr*, *Trional* and *Uropherine*. A short article is devoted to "American Fluid Extracts," in which a general process for their manufacture is given.

The descriptions of the individual compounds described are quite comprehensive, detailing in the case of a plant, the origin, description, composition, physiological and therapeutic properties, mode of employment and dose. In the synthetic remedies a method of preparation is included in most cases.

A few inaccuracies are noticed, as *alum root* for the synonym of *Geranium maculatum*, and *Gelsemium* is given as a member of the natural order *Solanaceæ*. Extended reviews of the earlier editions were given in this Journal.

*Minnesota Botanical Studies.* Bulletin No. 9, Part II, from the Geological and Natural History Survey of Minnesota. Conway MacMillan, State Botanist.

*The Graduate*, a periodical journal devoted to Pharmacal Education. Published under the direction of the Alumni Association of the Chicago College of Pharmacy.

The first issue of this publication occurred in April, 1893; a second number is now before us. It is devoted to many interesting topics concerning pharmacy, the most commendable of which is an Analysis of *Geranium Maculatum* by Ernest H. Stolz. We are glad to note that he calls attention to the common error which declares that geranium should be collected in autumn, while it has been shown that it is richest in tannin just before flowering in April or May.

*The Alumni Journal.* Published by the Alumni Association of the College of Pharmacy of the City of New York.

The third number of this monthly publication has reached us. The first number appeared early in the year, and the Journal bids fair to become a factor in the history of the New York College of Pharmacy. Where devoted to the diffusion of pharmaceutical knowledge, and placing it before the profession in its most acceptable form, we cannot have too many of these publications. Henry Kraemer is editor, with an unusually strong corps of assistants and associates.

No one interested in the profession of pharmacy will make a mistake in subscribing the small sum necessary to secure this Journal.

## MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, April 17, 1894.

The stated pharmaceutical meeting of the College was held this day, Thomas M. Newbold being called to the chair.

On motion, the reading of the minutes of the last meeting were dispensed with.

In consequence of the museum being occupied by the carpenters who were erecting new cases for the College herbarium collections of the late Daniel B. Smith and Elias Durand, the meeting was held in the Chemical lecture room.

A copy of Flückiger's monograph on the Cinchonas, translated by F. B. Power, was presented to the library, and a copy of the Extra Pharmacopœia, by Wm. Martindale, London, was presented by Prof. Remington, on behalf of the author, to whom the thanks of the College were returned.

Professor Trimble read a paper, from David Hooper, of Ootacamund, India, on *Myrica Nagi*, known under several common names as, Box Myrtle, Kaiphal, etc. The bark is used as a dye or stain of a light pink color; it is found in the various drug stores of Northern India as a remedial agent, being used for catarrhs. It is considered, when mixed with ginger, one of the best remedies for cholera, as it is astringent, carminative and tonic; the tannin seems to be associated with mineral bases. Prof. Trimble said he expected to receive some of the bark, but as yet it had not reached him.

Mr. Beringer expressed the hope the fruit and flowers would be obtained, as it is described as a fleshy fruit, which is unusual.

Specimens of the several species of *Myrica* which belonged to the Martindale Herbarium were displayed on the lecture table for comparison.

Mr. Beringer read a very interesting paper upon the genus *Myrica*, giving the appearance, uses and therapeutic properties. According to Schimmel & Co., it contained one-eighth of one per cent. of volatile oil. It will be noticed that a number of the herbarium specimens were of much larger leaf than those commonly growing around us.

Prof. Trimble stated that Mr. Manger, who examined the plant chemically, found two crystalline principles in it besides the tannin, and that an extract had lately been sent out from India under the name of Kino, and was thought to be used as such. On motion, both papers were referred to the Publication Committee.

Prof. Trimble said he had lately received a preliminary paper from Prof. Sayre on American-grown *Colocynthis*; this was grown under the direction of C. B. Allaire, Ph.G., from seeds supplied by Dr. E. R. Squibb. The gourds were unusually large, measuring from sixteen to twenty-one-and-a-half inches in circumference. The quantity of seeds was also much greater, being between five and six hundred, while the foreign had but three or four hundred.

Dr. H. W. Jayne sent a short paper on Terebene, which was read. The question was raised whether it was worth while to continue the treatment of the oil of turpentine until it was entirely inactive, as it has been found to be remedially valuable when it still contained three per cent. of turpentine; to render this last totally inactive would greatly enhance the cost without a corresponding improvement in its therapeutic value.

A paper upon animal and vegetable ferments, by Mr. Wm. B. Thompson, was read, and it, with the last-named paper, was referred to the Committee on Publication.

There being no further business, an adjournment was ordered.

T. S. WIEGAND, *Registrar.*

## PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

*Philadelphia College of Pharmacy—Junior Examination.*—The examinations of the Junior students during the past term were on the following subjects:

### PHARMACY.

*A*—(1) State the requirements necessary in the construction of a good balance for weighing. (2) How may its sensibility be increased or diminished? (3) Why should the arms of a single-beam balance be equal? (4) How would you test a balance?

*B*—(1) Define distillation. (2) Describe the difference between the alembic and the retort. (3) Describe the various forms of condensers, and state the advantages or disadvantages of each.

*C*—(1) Define desiccation and evaporation. (2) State how the former facilitates comminution. (3) What kinds of vessels should be used in evaporating above and below the boiling point?

*D*—(1) Describe the difference between simple solution and chemical solution. (2) What is a saturated solution? (3) Under what circumstances can a saturated solution be used as a solvent?

*E*—(1) Describe precipitation. (2) State the principal objects of the process, and how heavy and light precipitates may be obtained.

*F*—(1) How is the antidote to arsenical poisoning prepared? (2) State in detail how you would proceed if called upon to act very promptly in preparing the antidote.

*G*—(1) Name the systems in crystallography. (2) State the principles upon which the processes of crystallizing from hot saturated solutions depend. (3) How can large or small crystals be obtained at will?

*H*—(Answers to the following by the U.S.P. of 1880 or U.S.P. of 1890 will be accepted.) (1) What is official syrup? (2) What are the tests of impurity of the ingredients? (3) What methods are employed by the Pharmacopœia

for making official syrups? (4) Give the official names of a syrup made by each of the methods described. (5) How would you distinguish syrup from glycerin? (6) In what respects does honey differ from syrup in its components? (7) Why is honey less used than formerly, as an official vehicle for administering remedies.

*I*—(1) What is the specific gravity of mercury? (2) How many grains of mercury would a bottle hold which contains exactly one fluidounce of water? (3) Give the official names of two chlorides of mercury. (4) Why were the chlorides so named? (5) What is the antidote for mercuric chloride? (6) Describe the appearance of each chloride. (7) By what means does the manufacturer secure the difference in the appearance of the two chlorides? (8) What is the dose of each chloride?

## CHEMISTRY.

*A*—(1) Describe the construction of the mercurial thermometers. (2) What are the two thermometer scales in current use for chemical work?

*B*—Change 7° F. into the corresponding C.° reading. Change 79° C. into the corresponding F.° reading.

NOTE.—Please put all figures and calculations upon the paper.

*C*—(1) What is a prism? (2) What is the effect of a prism when placed in the path of a ray of white light? (3) What is the practical application of this for the chemist?

*D*—(1) Describe the decomposition of water by sodium or potassium. Write the chemical equation for this decomposition. (2) Describe the preparation of hydrogen by the aid of metallic zinc. Write the chemical equation for this reaction. (3) For what elements has hydrogen the strongest affinity? Mention experiments in illustration of this.

*E*—(1) Describe the element bromine, state whence it is obtained, and give a reaction for its production. (2) What are the compounds of bromine and the metals called? Describe several of these compounds of pharmaceutical importance. (3) How would you show that these compounds contained bromine?

*F*—(1) Give an outline of the manufacture of sulphuric acid on a large scale. (2) Write the chemical formulas of the following compounds: Sodium sulphate, acid potassium sulphate, magnesium sulphate, ferrous sulphate, ferric sulphate, Nordhausen sulphuric acid.

*G*—(1) State how carbon monoxide and carbon dioxide are made respectively. (2) Enumerate the points of difference by which they can be distinguished from each other. (3) Is there any acid formed from either of them? If so, give the chemical formula or formulas.

## BOTANY AND MATERIA MEDICA.

*A—Organs of Plants.* (1) Name a kind of plant which does not possess distinct organs. (2) Into what two classes are the organs of the higher plants divided with respect to their uses? (3) Name the members of each class. (4) Of the organs of vegetation, which are axial and which appendicular?

*B—The Root.* (1) State three of the most important characteristics of the root. (2) Define an adventitious root. (3) What two important uses have ordinary roots? (4) Name two uses other than the ordinary ones that roots

may have. (5) Draw a diagram of a fusiform root, pointing out the head, neck and root proper.

*C—The Stem.* (1) How does a stem differ from a root (a) in the appendages it bears and (b) in its mode of growing in length? (2) What organs must every bud include? (3) At what points on a stem do buds regularly appear? (4) Define a supernumerary bud. (5) What name would you apply to such a stem as that of the wheat or corn? (6) How would you distinguish a rhizome from a root?

*D—Phyllotaxy.* (1) In the  $\frac{3}{8}$  phyllotaxy, what is the angular distance in degrees from one leaf to the next one in the same cycle? (2) How many vertical rows of leaves or orthostichies on a stem having the  $\frac{5}{13}$  phyllotaxy? (3) Suppose the first two members of a series of alternate phyllotaxies were  $\frac{1}{3}$  and  $\frac{1}{4}$ , what would the next number of the series be?

*E—Leaf Forms.* (1) Draw a leaf which is described as follows: petiolate, exstipulate, lamina spatulate, apex emarginate, base obtuse, margin entire. (2) How many leaflets in a quadrate leaf? (3) How many leaflets has a quadraternate leaf?

*F—Anthotaxy.* (1) Name the two principal types of anthotaxy, and state how they differ from each other. (2) Give the names appropriate to each of the following kinds of flower clusters: that of the carrot, that of the sunflower, that of the currant, that of the forget-me-not, and that of the Indian turnip. (3) Name a familiar plant whose flowers are arranged in verticillasters.

*G—(1)* In what three different ways may anthers be inserted on their filaments? (2) Define an introrse anther. (3) Draw a diagram of a cross-section of a three carpelled, unilocular ovary whose placentation is marginal. (4) What are entomophilous flowers? (5) Give the appropriate botanical names of each of the following fruits: a plum, a grain of wheat, and a lemon. (6) Name a fruit that is a silique, one that is a sorosis, and one that is a tryma. (7) What two scars occur on every seed? (8) Write the botanical names of two plants belonging to the thallophyta, and state the class to which each belongs. (9) To what series, class and sub-class do each of the following plants belong: barley, spruce, fern and potato? (10) Name what seem to you the three most important characteristics of dicotyls, besides the fact that their embryos are dicotyledonous.

*H—(1)* Write the U.S.P. names of two very potent alkaloidal leaf-drugs, giving also the name of the principal alkaloid in each case. (2) Write the common names of the drugs that contain, respectively, the following active principles: cathartic acid, hygrine and artanthic acid. (3) Write the botanical names of three plants yielding leaf or flower drugs possessing the following properties, respectively: sialagogue, mydriatic and expectorant. (4) State what seems to you the one most characteristic structural difference between *matricaria* and *anthemis*. (5) Write the U.S.P. names of three leaf-drugs in which the leaves are punctate with internal glands. (6) Write the common name of a drug studied in this course that owes its activity wholly or largely to the presence of a volatile alkaloid. (7) Write the official names of two diuretic-tonic leaf-drugs derived from different natural orders, naming the natural orders in each case. (8) From what natural orders are the following drugs respectively derived: eucalyptus, coca and thea? (9) Name four different drugs that contain caffeine. (10) What poisonous drug studied in this

course owes its activity to the presence of a volatile acid? Write the botanical name and natural order of the plant.

#### EXAMINING COMMITTEE.

*A*—What is the meaning of the following botanical terms: Polypetalous, Gamopetalous, Apetalous? Under which of these divisions would the plants yielding the following official drugs be found: red rose, arnica, elder, kousso, calendula.

*B*—Give the formula for nitric acid. Describe three tests for distinguishing it. What are the compounds of nitric acid with the metals called? Name an official salt of nitric acid.

*C*—Give the weight in grams of each ingredient of a mixture as follows: Half a liter of ether, sp. gr. 0.725; 750 cubic centimeters of alcohol, sp. gr. 0.820; two liters of glycerin, sp. gr. 1.250; five deciliters of oil of turpentine, sp. gr. 0.855; and 100 cubic centimeters of chloroform, sp. gr. 1.490. Give also the total weight of the mixture, expressed metrically.

*D*—(1) What is Fowler's Solution? (2) Give its official name. (3) Give its English name. (4) How is it made? (5) What is its dose expressed in apothecaries' measure? (6) What is its dose expressed metrically? (7) Name two official antidotes for this solution. (8, 9) Give the method of preparing each. (10) Upon what does the efficiency of these antidotes depend?

#### OPERATIVE PHARMACY.

On Saturday, March 3, 1894, the Junior examination in operative pharmacy was held. 349 candidates were present. The work exacted was the making of camphor water, ointment of red mercuric oxide, and granulated sodium salicylate.

#### SPECIMENS.

At the final examination on March 10th, ten specimens representing the above branches were given to the class for identification.

#### SENIOR EXAMINATION.

The examination of the senior class for the degree of Graduate in Pharmacy, commenced March 20th, and was continued until March 27th. The following questions were submitted to each candidate:

#### PHARMACY.

*A*—(1) Express in figures fifty-seven cubic meters, fifty-seven cubic decimeters, fifty-seven cubic centimeters, fifty-seven cubic millimeters. (2) Having purchased five kilos of "Gum Opium," assaying 10.5 per cent. morphine, I find that it loses twenty-five per cent. of moisture on drying. How much morphine per cent. will it contain when dry? (3) How many pints of official tincture of opium will this dried opium make? (No allowance for loss in powdering.)

*B*—Give the unabbreviated official or Latin name, ingredients, brief outline of process, and describe the appearance of: Essence of spearmint, spirit of mindererus, volatile liniment, carron oil, bay rum, blistering cerate, turpeth mineral and basilicon ointment.

*C*—Give the English name, ingredients, brief outline of process, describe the appearance of: Emulsum chloroformi, liquor acidi arsenosi, infusum sennæ compositum, syrupus acidi hydriodici, tinctura ipecacuanhæ et opii, pilulæ phosphori, pulvis effervescens compositus and confectio sennæ.

*D*--(1) How is spiritus ætheris nitrosi made by the U.S.P., 1890, process? (2) Name the compound which the Pharmacopœia recognizes as the valuable constituent in this spirit. What is its boiling point? (3) Give the official test for this constituent. (4) What is the specific gravity of spiritus ætheris nitrosi? What are its common adulterations?

*E*--Give the color tests for the following: (1) The aloins. (2) Quinine. (3) Strychnine.

*F*--Define chemical, physical and therapeutical incompatibility, and write three prescriptions, giving correct metric doses, illustrating each kind of incompatibility. (1) Chemical incompatibility, (2) physical incompatibility, (3) therapeutical incompatibility.

*G*--(1) In compounding prescriptions, state under what circumstances it is advantageous to aid the solution of a solid by heating it with the solvent. (2) State when it is proper to filter a prescribed liquid preparation, and explain why, for certain reasons, filtration sometimes should not be resorted to. (3) When is it permissible to make an addition to a prescription without the consent of the prescriber? Give reasons for your answer. (4) Is it desirable, when renewing a prescription, to follow the order of mixing the ingredients originally used? If so, why?

*H*--(1) How is wafer-paper or wafer-sheet made? (2) Upon what property does its usefulness in administering powders depend. (3) Describe the method of using wafer-paper in making cachets. (4) Describe or draw a sketch of an apparatus for filling and sealing cachets. (5) How are tablet-triturates made? (6) How may these be made harder in consistence without affecting their usefulness?

*I*--(1) What is gelatin? (2) How is it made? (3) What classes of gelatin capsules are found in commerce? (4) Draw a sketch illustrating each class. (5) Describe the manufacturers' methods of filling capsules with liquids. (6) How may capsules be filled on the small scale by pharmacists? (7) How may the gelatin mass used for capsules be made to vary so as to produce capsules of different consistence?

*K*--(1) What substances are directed to be used in making official suppositories, U.S.P., 1890? (2) What physical properties are necessary to constitute a good suppository mass? (3) Describe the method of making rolled suppositories. (4) Describe the method of making moulded suppositories.

#### CHEMISTRY.

*A*--(1) What are the sources of the element sulphur? (2) What are the chief technical uses of sulphur? (3) Describe the official varieties of sulphur. (4) Enumerate the oxides and acids of sulphur, giving the exact chemical names and formulas. (5) By what tests would you be able to distinguish a metallic sulphide from a metallic oxide?

*B*--(1) How is metallic sodium made at present? (2) Give the reactions for the several commercial processes for making *sal soda*. (3) Mention the most abundant natural sodium salts, and state how and where they occur. (4) Give the formulas for *sodii carbonas*, *sodii boras*, *sodii phosphas*, *sodii pyrophosphas*, *sodii hypophosphis*, *sodii nitris*.

*C*--(1) Mention the chief ores of lead, and state how the metal is extracted from them. (2) What are the technical uses of metallic lead and of its alloys?

(3) Name the several oxides of lead, give their formulas, describe their appearance, and state their technical uses. (4) How is white lead made? (5) Give the formulas of *plumbi acetat*, *plumbi carbonas*, *plumbi iodidum*.

*D*—(1) How is *potassii bichromas* made? (2) What takes place when an excess of sulphuric acid is added to its concentrated aqueous solution? (3) Describe the pharmacopœial tests for this salt. (4) What chemical changes take place in each of these cases? (5) What pigments may be formed from *potassii bichromas*?

*E*—(1) Mention the most important ores of iron. (2) Give an outline of the process of extracting the metal from the ore. (3) What are the several varieties of commercial iron, and in what respects do they differ physically and chemically? (4) Give the formulas of the several sulphates of iron recognized in the Pharmacopœia, with the proper chemical names corresponding. (5) State how you can change a ferrous solution into a ferric one, and *vice versa*.

*F*—(1) What is an ether? Give the formula of an official ether. (2) What is an ester? Give the formula of an official ester. (3) What is an aldehyde? Give the formula of an official aldehyde. (4) What is a fatty acid? Give the formula of official fatty acid. (5) What is an amide? Give the formula of an official amide.

*G*—(1) Give the classification of the carbohydrates. (2) State what are the distinctive differences in formulas and reactions between the several classes. (3) What are the commercial sources of cane sugar, and what is their relative importance? (4) How can you distinguish between *saccharum* and *saccharum lactis*? (5) Give an account of the more important industries based upon cellulose.

*H*—(1) Show by graphic formulas the difference between a phenol and an aromatic alcohol. (2) Show by graphic formulas the difference between an aromatic acid and a phenol acid. (3) Give the formulas of two official phenol acids. (4) Give the formulas of two official phenols. (5) Give the formula and proper chemical name of salol.

*I*—(1) Describe naphthalene, state its sources and how extracted and purified. (2) Write the graphic formula of  $\beta$ -naphthol. (3) Write the graphic formula of  $\alpha$ -naphthylamine. (4) Write the graphic formula of  $\alpha$ -naphthoic acid. (5) What basic nitrogenous compound corresponds closely in formula with naphthalene?

*K*—(1) What are essential oils? (2) In what respects, physical and chemical, do they differ from the fixed oils? (3) How are they obtained from the substance in which they occur? (4) State the most important classes of constituents that occur in them, giving the chemical distinctions between them. (5) Mention some of the most important of the essential oils, and give their practical uses, both pharmaceutical and technical.

#### MATERIA MEDICA AND BOTANY.

*A*—(1) Write the U.S.P. or official names of three monocotyl drugs—one a root-drug, one a rhizome-drug and one an inspissated-juice drug. (2) The following are the botanical names of plants yielding official drugs: *Fraxinus ornus*, *claviceps purpurea* and *asagraea officinalis*. What is the official part and what the official name of the drug in each case?

*B*—(3) Write the names of two root-drugs that in overdoses act as narcotic poisons. (4) Write the name of the most important constituent in each of two



poisonous rhizome drugs that are official. (5) Name three different plants in which the alkaloid berberine is known to occur.

C—(6) Name three powerfully sialagogue official drugs—one a bark, one a root and one a leaf. (7) Write the names of two cholagogue drugs—one a rhizome and one an inspissated juice.

D—(8) What drugs contain the following principles, respectively: Emetine, pelletierine and jervine. (9) Write the name of a powerfully sudorific leaf-drug, of a powerfully tetanizing seed-drug, and of a powerfully febrifuge bark drug, each of which is official.

E—(10) Name a bark-drug which, when moistened and applied to the skin, produces vesication. (11) Name three very potent vegetable principles not alkaloidal, each derived from a different drug. (12) Name a rubefacient fruit-drug, a rubefacient seed-drug and a rubefacient root-drug.

F—(13) What official bark-drug, when macerated in water, emits an odor like that of bitter almonds? (14) What fruit-drug, when ground up with a solution of caustic alkali, emits an odor like that of mice? (15) What official bark-drug emits a faint odor of valerianic acid?

G—(16) Name three official drugs that owe their activities wholly or chiefly to the presence of volatile alkaloids. (17) Name three official drugs which are powerfully tonic to heart muscles. (18) Name three official drugs that powerfully depress the heart's action.

H—(19) Write the botanical names of the plants that yield the following, respectively: Lupulinum, kamala and picrotoxinum. (20) Two official bark-drugs are distinguished from all others by the fact that they turn deep red when a solution of caustic potassa is applied to their inner surface. Name the barks.

I—(21) What official fruit-drug from the umbelliferæ possesses no oil-tubes? (22) Name two official drugs which in the dry form are destitute of volatile oils, but which on maceration in water and distillation yield potent ones. (23) Name a seed-drug from the euphorbiacæ which by simple pressure yields a vesicant and drastic fixed oil that is official.

K—(24) Write the name of a cryptogamous-spore drug, of a gum-resinous umbelliferous drug, and of an oleo-resinous coniferous drug, each of which is official. (25) Classify the volatile oils and name an example of each class.

#### EXAMINING COMMITTEE.

A—(1) Give unabbreviated official name, specific gravity, and symbol of mercury. (2) Name some of the localities from which it is obtained. (3) In what combination does mercury usually exist in nature? (4) What process is generally used in separating it from this combination? (5) What two series of salts are formed by mercury? (6) To which series does corrosive sublimate belong? (7) Write the chemical formula and state the dose of corrosive sublimate. (8) Give the chemical formula of calomel. (9) Give a test for the presence of corrosive sublimate in calomel. (10) Name the official preparations in which mercury enters in the metallic state, giving the percentage of mercury in each.

B—(1) What is the difference between a granulated salt and one which is powdered? (2) Explain the cause of the formation of lumps during the process of granulation. (3) State how they may be avoided without resorting to

trituration. (4) How are granulated effervescing salts made? (5) What advantages are gained by the administration of remedies in this form? (6) Give an outline of the formulas of two official granulated effervescent salts. (7) Name one or more common household chemicals which are usually seen in the granular form.

C—(1) Give the official name of Calabar bean. (2) Give the botanical name of the plant. (3) Where is this plant indigenous? (4) What two names have been given to the active principle of Calabar bean? (5) What salts of the active principle are official? (6) What is the dose of these salts? (7) What preparations of Calabar bean are official? (8) What menstruum is used to exhaust the bean? (9) Give the dose of each preparation. (10) What are the medical properties of Calabar beans?

D—Give the English name or synonym, ingredients, brief outline of process, and describe the appearance of: liq. ferri et ammonii acetatis, pilulæ rhei compositæ, syrupus ipecacuanhæ, unguentum diachylon, tinctura gentianæ composita, vinum antimonii, emplastrum picis cantharidatum and spiritus juniperi compositus.

E—(1) How many cc. of distilled water would be required to weigh as much as five liters of a mixture of two parts of official glycerin and three parts of official alcohol? (No allowance for contraction.) (2) How many grams of mercury, sp. gr. 13.55, would it require to fill a 1,000 cc. measure which already contained 410 grams of official alcohol, at 15° C.?

F—(1) Give two tests for distinguishing the salts of copper and iron. (2) What three tests are used to distinguish between sulphites and thiosulphates? (3) Name three characteristic tests for lead salts. (4) What acids are used to dissolve metallic lead?

G—(1) What are fixed oils and fats chemically? (2) On boiling fixed oils or fats with potassium or sodium hydrates, what products are formed? (3) On treating fixed oils or fats with superheated steam, what official acids are produced? (4) When fixed oils or fats are oxidized by nitric acid with heat, what solid compound is formed? (5) Into what official preparation does this compound enter? (6) Into what official preparation does the sodium compound of a fatty acid enter? (7) From what source is adeps lanæ hydrosus obtained? (8) In what forms is petrolatum now official? (9) How do the "petrolatums" differ chemically from fixed oils and fats?

H—Give the maximum single dose of each of the following: (1) Diluted hydrocyanic acid. (2) Tincture of aconite. (3) Tincture of nux vomica. (4) Tincture of digitalis. (5) Tincture of belladonna. (6) Extract of opium. (7) Morphine sulphate. (8) Strychnine sulphate. (9) Codeine sulphate. (10) Atropine sulphate.

I—(1) How would you compound the following prescription?

R    Quininæ Sulphat., gr. xxx.  
       Ferri Reducti, gr. xxx.  
       Acidi Arsenosi, gr. ii.  
       Ext. Belladonnæ Fld., fʒi.  
       Nitroglycerini, m℥ $\frac{1}{10}$

M.    ft. massæ et in pil. no. xxx. divid.

(2) Criticise this prescription. What difficulties are likely to occur and what precautions would you take to avoid them?

R    Liq. Ammon. Acetat., f̄iv.  
       Acid. Acetic., f̄i.  
       Tinct. Ferri Chloridi, f̄ss.  
       Glycerini, f̄ss.  
       Mucilago Acaciæ q. s. ft. f̄viii.

Misce. Sig.—One teaspoonful every two hours.

K—(1) Write a prescription for thirty pills, using unabbreviated official names and expressing the quantities metrically, each pill to contain :

R    Arsenous Acid, gr.  $\frac{1}{20}$ .  
       Aloin, gr.  $\frac{1}{8}$ .  
       Vallet's Mass, gr. iss.  
       Sulphate of Cinchonidine, gr. ii.

M. Sig.—One pill t. d. p. c.

Translate the directions and name the best excipient.

(2) State exactly how you would prepare the following prescription. Would you dispense it as written? Give reasons for your mode of procedure.

R    Acidi Arsenosi, ʒ.  
       Potassii Bicarb, i.  
       Aq. Destillat., 500.  
       Ft. solutio sec. art.

Sig.—Let 4 cc. be given every two hours.

#### OPERATIVE PHARMACY.

The examination in operative pharmacy was held March 24, 1894, and consisted in making the following :

#### *Suppositories.*

Glycerin, . . . . .	8 cc.
Sodium Carbonate C.P., . . . . .	0.50 gm.
Stearic Acid, . . . . .	.85 gm.
Aloin, . . . . .	.40 gm.

Make six suppositories. Put into bottle.

#### *Capsules.*

Cinchonine Sulph., . . . . .	1.80
Powd. Capsicum, . . . . .	.60
Mix. Fill 1 doz. capsules.	

#### *Cachets.*

Cinchonine Sulph., . . . . .	1.20 gm.
Powd. Capsicum, . . . . .	.20 gm.
Mix. Make six powders. Put into cachets.	

*Plaster.*

Alc. Ext. of Belladonna Leaves, . . . . .	5'0 gm.
Yellow Wax, . . . . .	1'5 gm.
Resin, . . . . .	3'5 gm.
* Lead Plaster, . . . . .	45 gm.
Make Belladonna Plaster. Label the dipper.	

\* The dipper contains 50 gm. of Lead Plaster.

*Spread Plaster.*

Spread a breast plaster about seven inches in diameter with above plaster.

## ANALYTICAL CHEMISTRY.

The examination in analytical chemistry was held in the chemical laboratory on March 27th.

Each student was given two hours in which to make an analysis of a powder consisting of a mixture of three, four or five salts.

## SPECIMENS.

*Materia Medica:* Taraxacum, Pyrethrum, Gelsemium, Sanguinaria, Podophyllum, Euonymus, Granatum, Chimaphila, Ammoniacum, Myrrha. *Chemistry:* Alcohol, Sodii Hyposulphis, Acetanilidum, Sodii Boras, Potassii Ferrocyanidum, Potassii et Sodii Tartaras, Naphtalinum, Sodii Bicarbonas, Sodii Chloridum, Æther Aceticus. *Pharmacy:* Aqua Creosoti, Liquor Ferri et Ammonii Acetatis, Spiritus Ætheris Compositus, Syrupus Aurantii Florum, Pulvis Rhei Compositus, Pulvis Cretæ Compositus, Syrupus Ferri Iodidi, Tinctura Gentianæ Composita, Extractum Ergotæ Fluidum, Extractum Cinchonæ Fluidum. *Committee:* Liquor Plumbi Subacetatis, Pulvis Ipecacuanhæ et Opii, Tinctura Benzoini, Extractum Sennæ Fluidum, Lupulinum, Senega, Oleum Eucalypti, Potassii Bicarbonas, Ammonii Chloridum, Ferri Oxidum Hydratum.

*Seventy-third Annual Commencement. Friday Evening, April 13, 1894.*—The degree of Graduate in Pharmacy, Ph.G., was conferred by the President, Charles Bullock, on the following gentlemen :

<i>Name.</i>	<i>Subject of Thesis.</i>	<i>State.</i>
Adams, Bentley Bryant,	<i>Menthol,</i>	New Jersey.
Ames, Charles Eugene,	<i>A blast furnace,</i>	New York.
Alter, Geo. Merchant,	<i>Syrupus simplex by cold percolation,</i>	Pennsylvania.
Atkins, Frank Hean,	<i>Compressed tablets,</i>	Pennsylvania.
Aughinbaugh, Wm. Culbertson,	<i>The official inorganic salts,</i>	Maryland.
Bailey, John Henry,	<i>Acidum boricum,</i>	Pennsylvania.
Baker, George Fisher,	<i>Iodine,</i>	Pennsylvania.
Barlow, Walter Gilbert,	<i>Gossypium,</i>	Pennsylvania.
Barr, Robert Hamilton,	<i>Preparation of tinctures and fluid extracts,</i>	Pennsylvania.
Bauch, George Franklin,	<i>Accidents and poisoning.</i>	Ohio.
Beakey, George Bernard,	<i>Manufacturing pharmacists,</i>	Pennsylvania.
Benedict, William Paul,	<i>Camphor,</i>	Pennsylvania.
Bertsch, George Philip,	<i>Gossypium,</i>	Pennsylvania.

Name.	Subject of Thesis.	State.
Betz, Wm. Howard,	<i>The Pharmacy of emulsions,</i>	Pennsylvania.
Black, Charles Jeffries,	<i>Linum,</i>	Pennsylvania.
Blumhard, Chas. Albert, Jr.,	<i>Cotton,</i>	Arkansas.
Bowen, Willis Elliott,	<i>Assay of opium and its extract,</i>	New York.
Boyle, Frank Meagher,	<i>Kefir,</i>	Delaware.
Brallier, Stanley A. E.,	<i>Camphora,</i>	Pennsylvania.
Brellocks, Frederick John,	<i>Cypripedium pubescens,</i>	Pennsylvania.
Brennan, Francis Henry,	<i>Nickel and its preparations,</i>	Pennsylvania.
Britcher, Milton Weimer,	<i>Emulsions,</i>	Pennsylvania.
Brown, Daniel Edward,	<i>Camphor,</i>	Ohio.
Brown, James Reed Logan,	<i>Triturations,</i>	Pennsylvania.
Brown, Wilbur Beers,	<i>Thymol as a deodorant for iodoform,</i>	Pennsylvania.
Bunting, Frank Allison,	<i>Cascara sagrada,</i>	Pennsylvania.
Bush, Harvey Benjamin,	<i>Spongia,</i>	Pennsylvania.
Cameron, Frank Butler,	<i>Soap plants,</i>	Delaware.
Cappeau, Thomas Harrison,	<i>Serpentaria,</i>	Delaware.
Chalfant, Wm. Windle,	<i>Incompatibility,</i>	Pennsylvania.
Cherdron, Charles,	<i>Adeps lanae,</i>	Ohio.
Christ, George Raymond,	<i>The pharmacopœias of 1820 and 1890,</i>	Pennsylvania.
Claudy, Robert Blean,	<i>Unguentum hydrargyri nitratis,</i>	Pennsylvania.
Craig, Harvey Alfred,	<i>Iodoform,</i>	Illinois.
Crawford, James Adam,	<i>Taraxacum,</i>	Pennsylvania.
Culley, John,	<i>Granatum and its tannin,</i>	Utah.
Dare, Charles Wilfred,	<i>Coccus cacti,</i>	New Jersey.
Davis, William,	<i>Camphor,</i>	Pennsylvania.
Daws, Wm. Ruth,	<i>Copaiba,</i>	Pennsylvania.
Deen, Frank Snyder,	<i>Emplastra,</i>	Pennsylvania.
De Ford, Charles H.,	<i>Boroglycerinum,</i>	Kansas.
Desmond, Edward,	<i>Black oak bark,</i>	Wyoming.
Dilks, Harmon, Jr.,	<i>Camphora,</i>	New Jersey.
Douglass, Wm. Tyler,	<i>Camphor cream,</i>	Pennsylvania.
Dunn, Edward Walker,	<i>Contributions of coal tar to pharmacy,</i>	New Jersey.
Durham, John McCurdy,	<i>Vaseline and its tests,</i>	Pennsylvania.
Eakin, Henry Gray,	<i>Cubebs,</i>	Pennsylvania.
Ely, Frank William,	<i>Potassii bitartras,</i>	Pennsylvania.
Engle, Stratton R.,	<i>Ceylon cinnamon,</i>	New Jersey.
Eyer, Edward Augustus,	<i>Spiritus ætheris nitrosi,</i>	Pennsylvania.
Fackenthall, John Michael,	<i>Fluid extract of jalap,</i>	Pennsylvania.
Fishburne, Pliny,	<i>Hypodermic tablets,</i>	Virginia.
Flanagan, Thomas Francis,	<i>Acetic acid,</i>	Pennsylvania.
Fluck, Charles Lewis,	<i>Vanilla,</i>	Pennsylvania.
Fowler, Hudson DeMott,	<i>Ichthyol,</i>	Ohio.
Fraunfelder, Jacob Adam,	<i>Sulphur,</i>	Pennsylvania.
Furnell, Carl Bennett,	<i>The metric system,</i>	Maine.
Gabler, Theodore,	<i>Aluminium,</i>	Pennsylvania.
Gabrio, Frank Peter,	<i>Liquor sodæ,</i>	Pennsylvania.
Garver, Walter Joseph,	<i>Cod liver oil,</i>	Maryland.
Gebhardt, Ehr Gott William,	<i>Obsolete pharmacy,</i>	Pennsylvania.
Geety, Wallace Gillespie,	<i>Mistura glycyrrhizæ composita,</i>	Pennsylvania.

<i>Name.</i>	<i>Subject of Thesis.</i>	<i>State.</i>
Gibson, Hiester Franklin,	<i>Camphor,</i>	Pennsylvania.
Gerlach, Herman,	<i>Hydrastis,</i>	Wisconsin.
Goico, Ernest,	<i>Emulsions,</i>	West Indies.
Gould, Josiah Cole,	<i>Pareira,</i>	Pennsylvania.
Gregory, Robert Nicholson,	<i>Tablet triturates,</i>	Florida.
Gruhler, Martin,	<i>Achillea millefolium,</i>	Pennsylvania.
Gunn, Frank,	<i>Opium and its alkaloids,</i>	Pennsylvania.
Haas, Frederick William,	<i>Pharmacopœial glycerites,</i>	Pennsylvania.
Haenchen, Emil Frank,	<i>Syrupus sarsaparillæ compositus,</i>	Pennsylvania.
Hahn, Moses Alexander,	<i>Tinctura opii,</i>	Alabama.
Hall, Thomas Murphy,	<i>Unguentum aqua rosæ,</i>	Delaware.
Hamilton, Charles Ernest,	<i>Gossypii radidis cortex,</i>	Ohio.
Harms, Herman,	<i>Rubus villosus,</i>	Utah.
Harrold, William Henry,	<i>Nux vomica,</i>	Pennsylvania.
Hatton, Thomas Mifflin,	<i>Fermentation,</i>	Pennsylvania.
Healy, Joseph,	<i>Aluminium,</i>	Pennsylvania.
Hendee, Ulysses Grant,	<i>Assay of powdered opium.</i>	New York.
Henderson, Robert Guy,	<i>Castanea,</i>	Mississippi.
Herbst, Fred. John,	<i>Preservation of lard,</i>	Pennsylvania.
Hess, Miles Roscoe,	<i>Sodii boras,</i>	Pennsylvania.
Hightower, George Almer,	<i>Botany of Louisiana,</i>	Louisiana.
Hodgson, Edwin,	<i>Acidum sulphuricum dilutum,</i>	Virginia.
Hodil, James J.,	<i>A word on fluid extracts,</i>	Pennsylvania.
Holtzhausser, George J.,	<i>Tænifuges,</i>	Germany.
Howell, Edward Vernon,	<i>Rhus glabra,</i>	N. Carolina.
Hubley, John Hiram,	<i>Euphorbia pilulifera,</i>	Pennsylvania.
Huddleson, Frank W.,	<i>Kola nut,</i>	Dist. of Columbia.
Jackel, John Otto,	<i>Yerba santa,</i>	Pennsylvania.
Jennings, Joseph,	<i>Manna,</i>	Pennsylvania.
Jones, William Willets,	<i>Tincture of nux vomica,</i>	Pennsylvania.
Jordan, Calvin,	<i>The metric system,</i>	West Virginia.
Kachline, Frederick Wm.,	<i>Elixir iron, quinine and strychnine,</i>	West Virginia.
Kalbach, Harry Adam,	<i>Sapo,</i>	Pennsylvania.
Kappes, George Louis,	<i>Homœopathic pharmacy,</i>	Ohio.
Kelley, John Joseph,	<i>Tinctura opii deodorata,</i>	Pennsylvania.
Kenworthy, John,	<i>Sulphuric acid,</i>	Pennsylvania.
Keyes, Minor Ellery,	<i>Compressed powders or pills,</i>	Pennsylvania.
Kinsler, Lemuel Pastorius,	<i>Improved Bland's pills,</i>	Pennsylvania.
Kirk, Lewis Richardson, Jr.,	<i>The magnesite of Chester County,</i>	Maryland.
Kirk, Samuel Bird,	<i>Mineral glycerin,</i>	Pennsylvania.
Klopp, Lewis Calvin,	<i>Botany, as an aid to the pharmacist,</i>	Pennsylvania.
Kreider, Frank Light,	<i>Bleaching and its agents,</i>	Pennsylvania.
Krumrine, Sidney,	<i>Absinthium, analysis of,</i>	Pennsylvania.
Kuhns, Edwin Jacob,	<i>Oleum gaultheriæ,</i>	Pennsylvania.
Lanterman, Bartley La Rue,	<i>Pills and excipients,</i>	New Jersey.
Le Fevre, Acton Ash,	<i>Camphora,</i>	Pennsylvania.
Light, Walter Felix,	<i>Olive oil,</i>	Pennsylvania.
Lilly, Howard Harrison,	<i>Kava-kava.</i>	Pennsylvania.
Lippincott, Jesse Diverty,	<i>Patent nostrums,</i>	New Jersey.

Name.	Subject of Thesis.	State.
Lloyd, Richard Louis,	<i>Hydrogen dioxide,</i>	Pennsylvania.
Loveland, Rowland Wayne,	<i>Potassium,</i>	Pennsylvania.
Luft, George William,	<i>Berberis repens,</i>	Utah.
Lynch, Daniel Joseph,	<i>Camphor,</i>	Pennsylvania.
McCoy, Cornelius Joseph,	<i>Medicated waters,</i>	Pennsylvania.
MacCracken, Edward Glover,	<i>Aristol,</i>	Pennsylvania.
McCreight, Charles,	<i>Newer remedies,</i>	Pennsylvania.
McHale, Frank Patrick,	<i>Pichi,</i>	Pennsylvania.
McKee, Francis Town,	<i>Pharmacopœia non patrons,</i>	Delaware.
McNeil, Harry B.,	<i>Fermentation,</i>	Maryland.
Mack, James William,	<i>Eucalyptus,</i>	Pennsylvania.
Manger, Charles Christian,	<i>Myrica asplenifolia,</i>	Missouri.
Miller, Albert Donald,	<i>Olea Europœa,</i>	Ohio.
Mooradian, Thos. Mooshake,	<i>Methylic alcohol,</i>	Turkey.
Myers, Arnold Armstrong,	<i>Glycyrrhiza,</i>	Pennsylvania.
Myers, Henry Joseph,	<i>Senna,</i>	Pennsylvania.
Nagle, Clayton Moyer,	<i>Lard and its preservatives,</i>	Pennsylvania.
Nick, Wm. Herman Fred'k,	<i>Eugenia jambolana,</i>	Pennsylvania.
Nolan, Daniel Andrew,	<i>Syrups of U. S. Pharmacopœia,</i>	Connecticut.
Ohail, Irwin Edwin,	<i>Assay of extracts of nux vomica,</i>	Ohio.
Osborne, Albert Edgar,	<i>Olive oil,</i>	Pennsylvania.
Paschali, Theodore, Jr.,	<i>Silica,</i>	Pennsylvania.
Porter, Samuel H.,	<i>Zinc bromide,</i>	Pennsylvania.
Price, Harry Dunbavon,	<i>Lead, and its uses,</i>	Missouri.
Reinoehl, David Vogt,	<i>Assays of capsicum,</i>	Pennsylvania.
Reese, Lewis,	<i>Acidum citricum,</i>	Pennsylvania.
Rhein, Francis Xavier,	<i>Hydrogen peroxide,</i>	Ohio.
Richards, Frank Gore,	<i>Tinctures,</i>	Missouri.
Roseman, Charles Edward,	<i>Pepsin,</i>	Ohio.
Rothrock, Harry George,	<i>Citric acid,</i>	Pennsylvania.
Sage, Thomas,	<i>Recent antiseptics,</i>	New York.
Schearer, P. Weaver A.,	<i>Distillation of Whiskey,</i>	Pennsylvania.
Schuster, Joseph Bernard,	<i>Apiculture and its pharmacopœial products,</i>	New Jersey.
Scott, Charles Abbey,	<i>Calcium oxide,</i>	New York.
Sellers, Oscar William,	<i>Liquor magnesii citratis,</i>	Pennsylvania.
Sheely, Edward Valentine,	<i>Prescription department,</i>	Pennsylvania.
Shelton, Charles F.,	<i>Guaiaci resina,</i>	Ohio.
Shimer, Arthur Burton,	<i>Oleum morrhue,</i>	Pennsylvania.
Shoemaker, Charles Benj.	<i>Piscidia,</i>	Pennsylvania.
Smith, Beaton,	<i>A college of pharmacy education,</i>	Delaware.
Smith, James Auburn,	<i>Percolators,</i>	Ohio.
Smith, Joseph Vanest, Jr.,	<i>Potable water,</i>	Pennsylvania.
Smith, Robert Victor,	<i>Clarifying of liquids,</i>	Pennsylvania.
Sorber, Lewis Samuel,	<i>Mercury,</i>	Pennsylvania.
Spickler, Walter Scott,	<i>Adulteration of volatile oils,</i>	Pennsylvania.
Sprenger, William Alfred,	<i>Camphor,</i>	Pennsylvania.
Stevenson, Frederick Lee,	<i>Strophanthus,</i>	Maryland.
Stewart, Samuel Shelton,	<i>Menstruum for cocilaina,</i>	Ohio.

Name.	Subject of Thesis.	State.
Stout, Charles A.,	<i>Glycerin suppositories,</i>	Pennsylvania.
Sulouff, Samuel Henry,	<i>Copaiba, and its adulterants,</i>	Pennsylvania.
Taylor, Howard Davis,	<i>Syrups by the cold process,</i>	Delaware.
Taylor, Wm. Francis,	<i>Emulsion of cod liver oil,</i>	Pennsylvania.
Thayer, Houston Talbot,	<i>Grape fruit,</i>	Tennessee.
Thomas, David Walter,	<i>Quercus prinus,</i>	S. Carolina.
Tomkinson, Horace Lessy,	<i>Pharmacy,</i>	Pennsylvania.
Truckenmiller, Frank Edw.	<i>Mercury,</i>	Pennsylvania.
Vanhorn, Edward Rogers,	<i>Solution of ammonia,</i>	Iowa.
Wasley, Harry Malcolm,	<i>Kalmii latifolia,</i>	Pennsylvania.
Ward, Merton Barber,	<i>Zinc,</i>	Vermont.
Webb, Abner,	<i>Gossypium,</i>	Arkansas.
Wegener, August Gerhard,	<i>Saffron and its adulterations,</i>	Germany.
Weidler, Charles Lincoln,	<i>Assay of acetum opii,</i>	Oregon.
Whitcomb, William Higbee,	<i>Cocillaina,</i>	Michigan.
White, Ishmael James,	<i>Dilute hydrochloric acid,</i>	Maryland.
Wilcox, Wm. B.,	<i>Practice of ancient and modern pharmacy,</i>	New Jersey.
Wissler, Arthur John,	<i>Arsenic,</i>	Virginia.
Wood, George Young,	<i>Petroleum and its products,</i>	Canada.
Wood, Otis Hunter,	<i>Granular effervescent salts,</i>	Virginia.
Yerkes, Charles Markley,	<i>Liquor potassæ,</i>	Pennsylvania.
Young, Benjamin Franklin,	<i>Glycerin,</i>	Pennsylvania.
Ziegler, Howard Philip,	<i>Mel and apis mellifica,</i>	Pennsylvania.
Zimmerman, Hebert James,	<i>Antipyrine,</i>	Pennsylvania.

Total, 183.

Special certificates for Proficiency in Chemistry were awarded to Edward D. Heine, of Mississippi, and David T. Werner, of Pennsylvania.

#### STATES AND COUNTRIES REPRESENTED BY THE GRADUATING CLASS.

Alabama, . . . . .	1	Louisiana, . . . . .	1	Pennsylvania, . . . . .	106
Arkansas, . . . . .	2	Maine, . . . . .	1	South Carolina, . . . . .	1
Canada, . . . . .	1	Maryland, . . . . .	6	Tennessee, . . . . .	1
Connecticut, . . . . .	1	Michigan, . . . . .	1	Turkey, . . . . .	1
Delaware, . . . . .	7	Missouri, . . . . .	3	Utah, . . . . .	3
District of Columbia, . . . . .	1	Mississippi, . . . . .	1	Vermont, . . . . .	1
Florida, . . . . .	1	New Jersey, . . . . .	9	Virginia, . . . . .	4
Germany, . . . . .	2	New York, . . . . .	6	West Virginia, . . . . .	2
Illinois, . . . . .	1	North Carolina, . . . . .	1	West Indies, . . . . .	1
Iowa, . . . . .	1	Ohio, . . . . .	13	Wisconsin, . . . . .	1
Kansas, . . . . .	1	Oregon, . . . . .	1	Wyoming, . . . . .	1

The honorary degree of Master in Pharmacy was conferred upon Albert E. Ebert, of Chicago, Ill.; Robert Shoemaker, of Philadelphia; and Edward R. Squibb, of Brooklyn, N. Y.

The following members of the graduating class received the grade of

#### DISTINGUISHED :

John Culley, Herman Harms, George Wm. Luft.



MERITORIOUS:

Chas. J. Black, Harvey Craig, Wallace G. Geety, Robert Gregory, George L. Kappes, Chas. C. Manger, Charles E. Roseman, Charles A. Scott, August G. Wegener.

The Materia Medica Prize of a Zentmayer Microscope, offered by the family of the late Prof. J. M. Maisch, for original Histological Work on American Plants, was awarded to William Higbee Whitcomb.

The Pharmacy Prize, a Gold Medal, offered by Prof. J. P. Remington, for original Pharmaceutical Work was awarded to Wm. Culbertson Aughinbaugh.

The Chemistry Prize, a Chemical Balance, offered by Prof. S. P. Sadtler, for original Quantitative Analysis, was awarded to Chas. Christian Manger. And the following graduate received honorable mention in connection therewith: John Culley.

The Analytical Chemistry Prize of \$25, offered by Prof. H. Trimble, for original Chemical Work, was awarded to John Culley. And the following graduate received honorable mention in connection therewith: Chas. Christian Manger.

The John M. Maisch Prize of \$20 in gold, offered by Mr. J. H. Redsecker, of Lebanon, Pa., for Histological Knowledge of Drugs, was awarded to George Franklin Bauch. The following graduates received honorable mention in connection with the John M. Maisch prize: George Wm. Luft, August Gerhard Wegener.

The Operative Pharmacy Prize, \$25 in gold, offered by Mr. E. L. Boggs, Charleston, W. Va., for the best examination in Operative Pharmacy, was awarded to Lewis Reese. The following graduates received honorable mention in connection therewith: Rob't Blean Claudy, John Culley, James J. Hodil, Irvin Edwin Ohail, George Young Wood.

The Theoretical Pharmacy Prize, offered by Mr. H. J. Maris, for the best examination in Theoretical Pharmacy, was awarded to John Culley. And the following graduates received honorable mention in connection therewith: Charles Jeffries Black, Wm. Tyler Douglass, Stratton R. Engle, Ed. Augustus Eyer, Edw. Vernon Howell, Geo. Wm. Luft, Chas. Christian Manger, Edw. Rogers Van Horn, August Gerhard Wegener.

The Robinson Chemical Prize, a Gold Medal and Certificate, offered by Mr. J. S. Robinson, of Memphis, Tenn., for the best examination in General and Analytical Chemistry, was awarded to Charles Christian Manger.

The valedictory address to the graduating class was delivered by Professor Samuel P. Sadtler (see p. 227 of this issue).

The farewell supper, given by the professors to the graduating class, was held in the College Museum, Thursday evening, April 12th. The officers and trustees of the College were present, along with some other invited guests.

During the evening Mr. Wm. C. Aughinbaugh, on behalf of the Zeta Phi Society, presented an excellent crayon portrait of the late Professor Maisch; it was received for the College by Professor Sadtler.

The students also volunteered a subscription, amounting to over seventy dollars, to the electric light fund, for establishing an electric light plant by the College.

*Alumni Association of the Philadelphia College of Pharmacy.*—The thirtieth annual meeting of the Alumni Association was held in Alumni Hall, at the College, on Wednesday, April 11, 1894.

President David H. Ross delivered his annual address, and the Secretary and Treasurer submitted their annual reports. Appropriate action was taken on the suggestions of the President. The condition of the treasury was found to be satisfactory.

The following officers were elected :

President—Wm. Lincoln Cliffe, class '84.

First Vice-President—Jacob S. Beetem, class '78.

Second Vice-President—Dr. J. L. D. Morison, class '88.

Treasurer—Edward C. Jones, class '64.

Secretary—William E. Krewson, class '69.

Corresponding Secretary—Joseph Crawford, class '84.

Trustee of Sinking Fund—Thomas S. Wiegand, class '44.

New Members of Executive Board—Henry Trimble, '76 ; David H. Ross, '78 ; W. Nelson Stem, '73 ; Charles B. Hunterson, '81.

Mr. C. C. Meyer reported that a charter had just been granted to the Association.

In the evening the annual reception to the Graduating Class was held in Association Hall.

President Ross made the opening address. The class oration was delivered by Howard P. Ziegler, of Reading ; the class history by George L. Kappes, of Ohio, and the future of the class by Walter J. Garver, of Maryland.

Certificate for best Junior examination was awarded to David L. Greenawalt, of Pa.

The Alumni gold medal for the highest general average in the graduating class was presented to Geo. W. Luft, of Utah.

The following gentlemen received certificates for superiority in the respective branches:

Pharmacy—John Culley, Utah.

Chemistry—Chas. E. Hamilton, Ohio.

Materia Medica—Chas. C. Manger, Missouri.

General Pharmacy—Charles J. Black, Pennsylvania.

Operative Pharmacy—Lewis Reese, Pennsylvania.

Analytical Chemistry—Edwin Hodgson, Virginia.

Specimens—Frank H. Atkins, Pennsylvania.

A special certificate was given to August G. Wegener, of Germany, for the best collection of botanical specimens.

Mr. Geo. M. Beringer, Instructor of Microscopy, awarded certificates to the following who had passed the examination in that branch :

Charles Kohler, E. V. Howell, Geo. P. Bertsch, Elwyn P. Barr, E. Q. Anewalt, Emma L. Kay, Willis E. Bowen, John Culley, E. H. Lauer, C. C. Manger, H. B. Hunter, E. W. Gebhardt, W. C. Aughinbaugh, G. R. Christ.



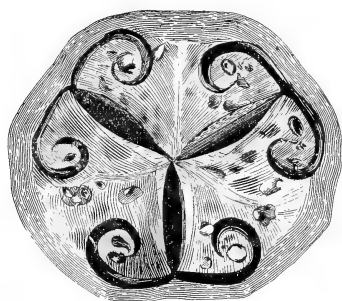


FIG. 1.

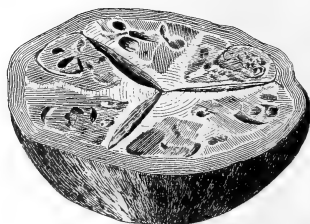


FIG. 2.

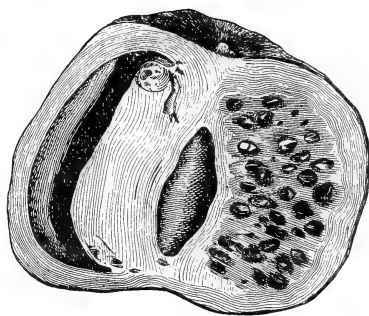


FIG. 3.



FIG. 4.

AMERICAN COLOCYNTH.

*Figs. 1 and 2, Transverse Sections. Fig. 3, Longitudinal Section. Fig. 4, whole fruit and portion of stem. All reduced.*



# THE AMERICAN JOURNAL OF PHARMACY

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*JUNE, 1894.*

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## AMERICAN COLOCYNTH.

BY L. E. SAYRE, University of Kansas.

A few months ago there was brought to the University a sample of fruit, which, it was stated, was interesting from a medical standpoint. The donor, Judge J. S. Emery, of Lawrence, Kansas, President of the National Irrigation Association, had just returned from a visit to California and New Mexico, and this specimen he said was given to him by a "very intelligent gentleman," connected with the Canaigre works at Deming, New Mexico, who had raised it himself, as an experiment. The fruit on examination proved to be an excellently developed gourd of Colocynth. My interest was at once excited, and a correspondence with the original donor, whose name was then unknown, being desired, a letter regarding the specimen was addressed immediately to the Superintendent of the Canaigre works at Deming, which, to my surprise, brought a reply from an old acquaintance and classmate, Mr. Charles B. Allaire, Ph.G., Class of '67, Philadelphia College of Pharmacy.

In this reply Mr. Allaire stated that the "fruit was raised from Trieste seed obtained from Dr. Squibb, Brooklyn," who asked him, in making agricultural experiments, to compare the fruit resulting from this seed with that of the imported article from Trieste, and to point out any differences which might arise from variation of climate. Mr. Allaire also stated that "there were from 65 to 80 melons per vine," and that he might have had many more but for the frost, as the vine was full of flowers and embryo fruit when frost came. In a subsequent letter he said, "I thought you might be surprised at the size of the apples. I do not know under what con-

ditions they grow in Europe. These were watered freely, and were much larger than those grown with ordinary rainfall. I don't think there can be any contamination, unless from a melon patch a long distance off, and beyond the influence of our prevailing winds, which are from the west."

Mr. Allaire at a later date sent an invoice of the fresh *Colocynth* apples, 7 in number. These, as taken from the package, had the following circumference measurements (the first figures representing vertical and the second horizontal measurements):

(1)  $13 \times 13\frac{1}{2}$  in.; (2)  $23\frac{1}{2} \times 24$ ; (3)  $22\frac{1}{4} \times 22\frac{1}{2}$ ; (4)  $18 \times 19$ ; (5)  $20\frac{1}{4} \times 20\frac{1}{2}$ ; (6)  $18\frac{3}{4} \times 18$ ; (7)  $21 \times 21\frac{1}{4}$ .

The exterior had a marbled green surface. The interior exhibited a rind about  $\frac{1}{2}$  inch thick, enclosing a white spongy pulp, imbedded in which were numerous seeds. A section parallel to the axis showed vertical rows of seeds upon fleshy parietal placentæ, which, on transverse section, were seen to project to the centre of the fruit, then divide and turn back, making convoluting branches directed one toward the other. This structure made apparent three distinct wedges, each of which seemed to have two divisions bearing the dark brown, almost black, seeds. Here and there were found white, perhaps unripe, seeds. The fruit gave forth an odor not unlike that of cucumber, also suggesting that of watermelon.

The accompanying figures (see Frontispiece) show the whole fruit, a tranverse and longitudinal section of the same, an enlarged section of the rind and pulp, and the stem and leaves of the plant as they were sent to me.

The principal differences between the gross characters of this fruit and the imported article is that of size, and a correspondingly larger number of seeds which are larger in proportion and darker than those of the foreign grown *colocynth*. In the imported fruit there are usually from 200 to 300 seeds, while the average number in the American is from 500 to 600. Physiological experiments upon the powder seemed to indicate that the American *colocynth* was only about two-thirds as powerful in cathartic action as that of the Trieste fruit. To give some idea of the weight, I would here state that apple No. 6 weighed 1,101 grams; the rind from this 693 grams, and the seeds 13.42 grams. The pulp weighed 394.58 grams, which when dried at a temperature not exceeding  $50^{\circ}$  C., to constant weight, yielded 31.75 grams, thus showing a loss of moisture of

91.92 per cent. The powder from the dried pulp was light in color, resembling the powder from the Indian fruit, and like the latter very bitter; the dust arising from it irritating to the eyes and nostrils, but differing considerably from the other in density, being much more compact and less fluffy.

As time has permitted, I have endeavored to make a comparison between this American Colocynth, and that of the Trieste fruit of the market by a somewhat crude analysis. A complete analysis of the two products for the purposes of comparison was deemed unnecessary, but a less complicated scheme was adopted, which it was thought not only accomplished the purpose, but was best suited to the comparatively small quantity of the dried pulp I found myself in possession of, after proper desiccation of the fresh apples had taken place.

Incidentally I might here mention that an attempt was made to dry the whole unbroken, decorticated apples, in the open air, by suspending them in open frames made of string. The air was warm and a good current stirring, but, after drying, on cutting open the shrivelled and apparently dry apples, there appeared in the somewhat damp interior, patches of black and white mould, which so penetrated into the tissue as to make the drug valueless. Suspending the unbroken and peeled fruit over a coil of steam pipe, in a perfectly dry room, free from dust, gave the same result. To dry the pulp successfully, I found it best to cut the pulpy mass into thin slices and lay these upon porcelain plates in a hot-air oven, kept at the temperature of about 50° C. From what I can learn of the collection and drying of the fruit in India, it is a matter of no difficulty to accomplish the latter there in the open air; but all attempts to dry either the whole or peeled fruit here in the atmosphere, proved a failure on account of the insidious growth of saprophytic fungi—principally the omniverous *mucor* and *penicillium*.

Returning to the analysis, I have said a simple method was adopted which seemed to be sufficient for the purpose of making comparison with the foreign fruit. The dry pulp, deprived of seeds, was reduced to powder and treated with various solvents, the extracts from which were weighed and carefully examined, according to details given below. In this way were obtained (1) an ether-chloroform extract; (2) an alcoholic extract from dregs from 1; (3) an aqueous extract of dregs from 2. Determinations were made of the various extractives for

sugar, gum, fat, resin, amyloid and albuminous substances, cellulose and ash.

A separation of the bitter principle, *colocynthin*, was thought might furnish valuable means of ascertaining the relative value of the American Colocynth, but unfortunately for the isolation of this principle there seems to be no process which in the hands of the analyst will yield uniform and reliable results. Test experiments with the commercial powdered colocynth, for the purpose of verifying Waltz's, Henke's, and the method suggested by George Wagner (*Proc. Amer. Pharm. Asso.*, 1893, p. 179), were made. But in no case (operating on small quantities) could such uniform results be obtained as would recommend either of the processes for the purpose in hand. That is, either process with the same powdered Colocynth yielded variable results; three trials, for example, were made with each process, using the same drug each time, and the three results were so variable that I could not depend upon them for my purposes. This I presume was largely due to the want of skill on my part.

The details of the analysis may briefly be stated as follows:

(I) *Resin, Fat, etc.*—By the use of a continuous extraction apparatus a chloroform-ether extractive was made. The ethereal liquid evaporated; the extractive treated with petroleum spirit which latter solution, when evaporated and weighed, was noted as fat. The residue treated with alcohol and the alcoholic solution evaporated; this precipitated by water; the precipitate, collected and weighed, was noted as resin.

(II) *Reducing substances (sugar?)*—An alcoholic solution of the dregs from I was made; the amount of total extractive thus obtained was noted, and an aqueous solution of the extract was treated with Fehling's solution, and the quantity of sugar thus indicated was noted as reducing substances. It may be stated incidentally that this alcoholic solution when concentrated was entirely soluble—not precipitated—in water.

(III) *Gum.*—A cold, aqueous solution, followed by a warm aqueous percolation of the dregs from II, was then made. The concentrated aqueous solution was precipitated by the addition of two volumes of alcohol. The precipitate collected, dried, weighed, incinerated and again weighed; this weight was noted (that is the differences between the last two weights) as gum.



(IV) *Amyloid Principles*.—The dregs from *III* were treated with water acidulated with sulphuric acid for six hours, and the solution tested quantitatively for sugar. The result multiplied by .9 was noted as amyloid substance.

(V) *Cellulose*.—The dregs from *IV* were first treated with alkaline water (2 per cent. KOH) washed with water, then with ether and alcohol, the dried residue weighed, ignited and again weighed; the weight was noted (that is the difference between the last two weights) as cellulose.

(VI) *Albuminoid Principles*.—By the Kjeldahl method the nitrogen was determined, which, by the usual factor, was converted into albumen.

An hydro-alcoholic extract, using the official menstruum, was also made.

Parallel determinations of these extracts and constituents were made with the powder of the dried pulp of the imported fruit.

## SUMMARY OF ANALYSIS.

Comparing the American with the imported colocynth. Percentages calculated from oven-dried powder:

Extracts and Constituents.		Imported.	American.
(I)	Ether-chloroform extract, . . . . .	3'21	4'62
	(a) Fat. (Petroleum-ether extract from I), 1'11		'521
	(b) Resin from I, soluble in alcohol and precipitated by water, . . . . .	'64	'48
(II)	Alcoholic extract (of dregs from I), . . . .	16'61	23'23
	Principles acting as reducing sugar in II, 2'15		10'31
(III)	Aqueous extract, . . . . .	31'07	24'69
	Gum (precipitated from III), . . . . .	9'36	12'61
(IV)	Amyloid principles (in dregs of III), . . . .	2'07	2'34
(V)	Cellulose, . . . . .	13'5	14'76
(VI)	Albuminous (protein) compounds, . . . .	14'31	14'69
(VII)	Ash, . . . . .	9'76	6'01
(VIII)	Moisture (in air-dry powder)*, . . . . .	6'8	7'9
	Diluted alcoholic (official) extract, . . . .	32'68	38'87

\* What is meant here by air-dry powder, with reference to American Colocynth, is a powder dried at as low temperature as possible—not dried to constant weight. It may be said that the fresh pulp, deprived of seeds, contained about 92 per cent. of moisture.

It may be stated that the aqueous extract (*III*) was scarcely bitter, most all of the bitter principles being extracted by the solvents *I* and *II*. I regret that the quantity of powder left after the above treatment was not sufficient to make it worth while to continue the effort to isolate the bitter principle, Colocynthin. I hope to do this

at a future time, when I may be fortunate enough to discover a simpler and more wieldy method than that referred to, and when I may obtain a fresh supply of the American *Colocynth*.

As a result of this crude analysis, I would say, in closing, that I am of the opinion that the watermelon patch, although quite remote from the bitterapple patch, must have had a slight influence upon the product of the latter.

Lawrence, Kan.

## THE SOLUBILITY OF RESIN OF *PODOPHYLLUM* IN CONNECTION WITH THE TESTS OF THE UNITED STATES PHARMACOPŒIA, 1890. —

BY J. B. NAGELVOORT.

Contribution from the Pharmaceutical Laboratory of Parke, Davis & Co.

American pharmacy is under obligation to Mr. Geo. M. Beringer for the courageous expression of his opinions in his "Critical Review of the Seventh Decennial Revision of the Pharmacopœia of the United States." The figures, by which he proves that the Pharmacopœia bears, on p. 338, an erroneous statement, to the effect that the resin of the root of *Podophyllum peltatum* is soluble in boiling water, are of considerable importance to us American pharmacists. Inasmuch as the bulk of podophyllin consumed in the world is probably manufactured in the United States, a conflict with European consumers, in regard to the qualities of the article might seriously disturb the market. Wholesale dealers could insist on the identity reactions of the U. S. P. in their purchases.

I venture to hope that the following contribution will be accepted in that spirit of tolerance with which Mr. Beringer's critique ought to be greeted. It has seemed to me important that a statement of parallel experiences respecting the solubility of Resin *Podophyllum* appear on record in the same journal. Year after year, a wealth of information is treasured up in our records, upon which the profession has a perfect right to draw. The following data are offered here, since they do not appear in print in the form of a separate publication.

The tabulated report below represents the actual status. The five samples were original samples and none were over two years old.

I am perfectly aware that a dilemma confronts me here: Does a *Podophyllin* answering to the requirements of the U. S. P. contain more of the active portions than the product at present in the market? This query immediately gives rise to another: Is it possible

to manufacture a product according to the Pharmacopœial tests? Is the regular *modus operandi* correct, as described by Mr. Beringer on p. 12, of the January number of the "American Journal of Pharmacy," for the determination of the matter soluble in boiling water? Or, must we abide by Prof. Power's process? Personally, I have boiled one gram of the resin, with about 100 cc. water for five minutes; decanted the fluid through a filter; evaporated the filtrate; during the evaporation boiled the undissolved residue, remaining in the flask, with a fresh quantity of water; decanted closely, filtered through the same filter, and repeated the operation once more, adding the filtrate to the since evaporated quantity, the water remained nearly colorless at the third repetition. The residue of the evaporation was dried to constant weight (100° C.), as is usual in analytical work. Here might have crept in an error of a few milligrams of soluble matter, but this can be overlooked for pharmaceutical purposes. The influence on the percentage was, in my opinion, not very great.

The sample that yielded, under the comparative testing, the highest results to ether and to boiling water (III), has been submitted to a more prolonged boiling process.

One gram of the drug has been boiled five times with 50 cc. of water; the fluid obtained was decanted and filtered through the same filter, and the residue, 6 cc., dried to constant weight at 100° C.

Results: thirty-two per cent.—far different from eighty per cent.

The pharmacographical information at my command respecting the roots used is meagre and does not contribute anything to our knowledge. The collection is left to herb-gatherers, and the roots are manufactured for Podophyllin as obtained from them.

The tabulated report below needs no further comment:

Samples.	Solubility in Absolute Ether.	Solubility in Boiling Water.	Solubility in Alcohol, 90 per cent.	Solution in KOH and Acids.	Color of Samples.	Reaction of FeCl <sub>3</sub> in Watery Solution	Moisture.
	Per Cent.	Per Cent.					Per Cent.
I	81.4	26.4	The Pharmacopœia requiring in all proportions, any deviating experience would give rise to a fruitless controversy.	Pharmacopœia prescribes no proportions.	Differed largely from Pharmacopœia, varying from dk. gr. to yellow green.	Agreed with U. S. P., but this does not prove much.	—
II	80.4	24.8					—
III	88.8	28.1					3.6
IV	77.8	26.0					—
V	± 80.0	23.7					—

\* I have only a small sample and want to preserve this, the color being entirely different from that of previous samples. U. S. P. requirements, 15-20 per cent.

## THE TANNIN OF PUNICA GRANATUM.

BY JOHN CULLEY, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.  
No. 135.

Considerable difficulty was experienced in obtaining a good quality of the drug, which appears to be but little used in this section. Before taking up the study of the special constituent, it was thought desirable to subject the bark to the action of solvents, that a knowledge of the proximate composition of the sample under examination might be gained thereby.

The following are the summarized results of the analysis :

	Per Cent.
Benzol Extract,	
Fat, fixed oil, wax and caoutchouc, . . . . .	76
Stronger Ether Extract,	
Crystalline resin and chlorophyll, . . . . .	30
Absolute Alcohol Extract,	
Tannin, gallic acid, alkaloids and glucose, . . . . .	9.93
Distilled Water Extract,	
Glucose, mucilage, dextrin and extractive, . . . . .	12.35
Alkaline (0.2 per cent. Sodium Hydrate), Water Extract,	
Pectin, albumenoids and extractive, . . . . .	6.26
Acidulated (0.2 per cent. Hydrochloric Acid) Water Extract,	
Pararabin, calcium oxalate and undetermined, . . . . .	7.62
Chlorine Water,	
Lignin, . . . . .	8.93
Cellulose, . . . . .	31.89
Moisture, . . . . .	8.70
Ash, . . . . .	10.56
Loss, . . . . .	2.70
Total, . . . . .	100.00

## EXTRACTION AND PURIFICATION OF THE TANNIN.

Acting on the advice of Professor Henry Trimble, acetone was selected as the solvent for extracting the tannin.

The ground bark was percolated with acetone, the solvent recovered, the extract treated with water and the resinous principles filtered off. The filtrate was shaken with several successive portions of ether, which were separated from the aqueous layer, mixed, and spontaneously evaporated.

The residue, left after the dissipation of the solvent, was treated

with water, the solution filtered and again shaken with ether, which removed, and left upon evaporation, crystals which gave the following reactions for gallic acid :

Ferric chloride, dark-blue color.

Sodium carbonate, green color.

Sulphuric acid, purple red color.

The aqueous layer, from which the gallic acid had been removed by ether, was agitated with acetic ether. The several quantities of this liquid so applied, were mixed, and distilled, under reduced pressure, to dryness. The residue was treated with a mixture of two volumes of alcohol and one volume of ether, the insoluble part was separated by filtration and the filtrate distilled to dryness under diminished pressure.

By repeating this process several times, a porous, red-brown tannin was finally obtained. This was further purified by solution in water, and filtration through its lead compound obtained by precipitation of part of the solution with lead acetate.

From the much lighter colored filtrate acetic ether removed a purer tannin.

The aqueous layer, from which the gallic acid and some tannin had been removed by ether and acetic ether respectively, was now completely precipitated with basic lead acetate. The mixture was filtered. The precipitate produced by the lead salt was suspended in water and decomposed by hydrogen sulphide. Lead sulphide was separated by filtration and the filtrate warmed to expel the excess of the gas, after which it was cooled, saturated with sodium chloride and agitated with successive portions of acetic ether. This solvent removed the tannin, and, upon being recovered under reduced pressure, left the same in a purer condition than when obtained by the preceding methods.

All the tannins were further purified by solution in a mixture of three parts by volume of ether and one part by volume of alcohol, filtering and distilling under reduced pressure, whereby they were changed into a more or less porous form.

All of these tannins were found to be the same, as shown by the following reactions of their one per cent. solutions, from which gallic acid had previously been removed by agitation with ether.

For comparison, the reactions of gallotannic acid are placed alongside of those obtained.

Reagent.	Tannin of <i>P. Granatum</i> .	Gallotannic Acid.
Ferric chloride, . . . . }	Blue-black ppt.	Blue-black ppt.
and		
Ammon. carbonate, . . }	Purple ppt.	Purple ppt.
Tartar emetic, . . . . }	Faint cloudiness.	Faint cloudiness.
and		
Ammon. chloride, . . }	Pale ppt.	Pale ppt.
Potassium bichromate,	Brown ppt.	Brown ppt.
Calcium hydrate, . . . }	Light-colored ppt., turn- ing blue.	Light-colored ppt., turn- ing blue.
Bromine water, . . . .	No ppt.	No ppt.
Ferric acetate, . . . .	Blue-black ppt.	Blue-black ppt.

The tannins were submitted to ultimate analysis with the following results:

	I.	II.	III.
Carbon, . . . . .	50'60	50'52	50'34
Hydrogen, . . . . .	3'88	4'13	3'98
Oxygen, . . . . .	45'52	45'35	45'68
	100'00	100'00	100'00
	Average of three combustions.		Gallotannic acid $C_{14}H_{10}O_9$ .
Carbon, . . . . .	50'48		52'10
Hydrogen, . . . . .	3'99		3'52
Oxygen, . . . . .	45'53		44'38
	100'00		100'00

In view of the fact that the qualitative reactions of this tannin agree with those of gallotannic acid, and that the ultimate composition compares quite closely for a substance so difficult to purify, on account of its amorphous condition, we are forced to conclude that the tannin of *Punica Granatum*, is identical with that of galls.

## ECONOMIC BOTANY.

By EDSON S. BASTIN, A.M.

Economic Botany may be briefly defined as botany applied to useful ends, or as the study of plants in relation to the wants of mankind. That plants do stand in very close relation to human happiness and welfare, and even to the necessities of man's existence, is a fact so obvious that it scarcely needs to be dwelt upon. We depend upon the vegetable world for the greater share of our food, and, if we take into account the fact that the animals we employ for food, all either directly or indirectly obtain sustenance

from plants, we may say that we are absolutely dependent upon them for the essentials of our diet, and would quickly perish without them.

We depend scarcely less upon them for our clothing and building materials, and for numberless other things upon which our comfort and well-being depend.

We also draw from the vegetable world the greater part of the medicines we employ in healing our diseases. There are also the best of reasons for believing that if it were not for the chemical activity of plants in breaking up the carbon dioxide so constantly exhaled into the atmosphere from the lungs of animals, from the chimney throats of our factories and private dwellings, and from the processes of decay that go on about us everywhere—if it were not for this and the restoration of pure oxygen to the atmosphere that the chlorophyll plants are all the time accomplishing, the atmosphere itself would soon become so vitiated that it could no longer sustain the higher forms of animal life, and we should perish from the earth.

In still another respect, we are dependent on this world of plants. If it were not for the bacteria and fungi, those despised and very much dreaded parasitic and saprophytic organisms whose work is largely that of tearing down and restoring to the mineral kingdom, and so to available forms for growth, dead organic bodies, the earth would soon be piled so high with corpses that there would be neither room nor sustenance for living beings.

It is largely on account of these relations between plants and human welfare that botany, the science of plants, has grown up. True, superstition has had something to do with its beginnings, as it has with those of other sciences, chemistry and astronomy, for example. The superstitious belief in a philosopher's stone stimulated the research which gathered together many important facts that have greatly helped to lay the foundation of chemical science. Likewise, it was a superstition that the stars sway the destinies of men, but it stimulated observation of the heavenly bodies and aided to accumulate the facts on which rests the superstructure of modern astronomy. So, in botany, for example, the absurd doctrine of signatures, which so long prevailed in medicine, led to a decided extension of our knowledge of plants, and so helped build a science of botany.

We have many things to blame superstition for; as a general thing the world has no use for it, but it is well to recognize the fact that it has not always been wholly evil in its effects.

But the foremost cause of the development of botany, in its earlier years at least, was *utility*.

Some knowledge of plants was so much one of man's necessities—to know what plants were useful and what ones dangerous—that long before he reached the stage of mental development when science in any proper sense was possible, a considerable body of facts were gotten together to build upon when the proper time should come. Thus, as we are well aware, the use and cultivation for food, medicine or textile materials of many of the plants we value most, extends far back of the period when written human history began. This is the case with wheat, maize, barley, millet, sorghum, the opium poppy, cotton, the banana, apricot, orange, melon, pumpkin, bean, pea, manioc, olive, rice, peach, sweet potato and flax.

In many of these instances, in fact, as with maize, we are absolutely ignorant of the wild plant from which the cultivated form is derived. In some cases, most likely, the changes brought about by the ages on ages of cultivation are so great that we are now unable to identify the cultivated with the wild parental form; it has, in fact, been developed into a distinct species. This, perhaps, is the case with wheat. In other instances, probably the parental form has perished altogether, as DeCandolle believed to be the case with maize.

In one sense, then, botany *began* as economic botany, began with the utilities in far-off times, and since then until comparatively recent times has chiefly occupied itself with them. But when man reached the age of reason, and science in the proper sense of the term became a possibility, plants came to be studied, not solely or chiefly with reference to their uses, but from a desire to understand what they were in themselves, what were their relations to each other, to the mineral world on the one hand and to the other half of the organic world on the other. The passion to know plants took possession of some men as that to know the mechanism of the heavens or the structure and development of the earth possessed others, and so scientific botany became a reality.

This new development of botany may be said to have begun



about three centuries ago, with the work of the Florentine, Cæsalpinus, but it made only slow progress until about a century later, when the Englishman, John Ray, in his *Methodus Plantarum*, laid the first really rational basis for plant classification. From this time on, through the work of Tournefort, Linnæus, Jussieu, A. P. De Candolle, Endlicher, Lindley, Hooker, Bentham, Alphonse De Candolle and Gray, systematic botany has made rapid and splendid progress.

Necessarily, owing to the later development of the compound microscope and that of chemical science, the growth of physiological botany was more retarded. Although in ancient times some crude notions existed about the sexuality of plants, the functions of stamens and pistils do not appear to have been understood until Grew explained them in 1676. From this time until 1823 no great progress was made in this branch. In this year, Amici discovered the pollen tubes, and a little later Robert Brown traced them to the nucellus of the ovule. Since then the embryology of plants has made rapid strides through the labors of such men as Schleiden, Mohl, Naudin, Hofmeister, Strasburger, Baillon, Bornet, Decaisne, Tulasne, and last, but not least, Darwin.

The latter's work on cross-fertilization not only opened up a wholly new field in connection with the subject of sexual physiology, but his works on climbing plants and on insectivorous plants, as well as his earlier work, in which he promulgated his doctrine of the origin of species by natural selection, have given a tremendous impulse to other branches of vegetable physiology.

It is true that this development of which we have just been speaking has mainly been on the purely scientific, rather than on the utilitarian side, at least until quite recently. But a science pursued for its own sake, with a pure love of knowledge for its motive, and regardless of ulterior results, could not but lead to important practical applications, and so it has been in this instance. Especially have the developments in vegetable physiology found abundant applications. There is no branch of economic botany that has not received tremendous impetus from the researches of such men as Sachs, Strasburger and Darwin.

The researches of these men seem far enough from what is ordinarily called practical, nevertheless they have served as a leaven, to leaven the whole lump of botany, practical as well as theoretical ;

and economic botany, which for a thousand years had stood still, now shows everywhere signs of the most stirring activity. Not only are the old departments of the subject revived, but new ones have sprung into life. Agricultural experiment stations, in many cases most elaborately equipped for the investigation of all that relates to useful plants, have been established in every country in Europe, and in nearly every State in the Union; courses in forestry have been established in some of the European, and I believe in at least one of our American Universities; and various professional schools, particularly medical schools and schools of pharmacy, have felt the new impulse, and established laboratories where medicinal plants are investigated structurally, chemically and with reference to their physiological action.

Let us glance now at the departments of Economic Botany. These may be stated to be as follows: (1) Agricultural Botany. (2) Horticultural Botany, with its sub-departments of Pomology, Arboriculture and Floriculture. (3) Forestry; and (4) Medical or Pharmaceutical Botany.

This classification is in some respects one of convenience and custom rather than a strictly scientific one. It would be hard, for example, to draw a sharp line of demarkation between Agricultural and Horticultural botany.

Agricultural botany, using the term in its commonly accepted sense, includes all knowledge relating to the plants which are cultivated on the farm in distinction from those cultivated in gardens or orchards, and from those growing wild in field or forest. It includes the botany of the cereals, the fodder plants, the edible roots and tubers, various textile plants and others whose products are widely used or cultivated on an extensive scale.

Under Horticultural Botany is usually included the botany of those plants which are cultivated in gardens and orchards, whether for food or other utilitarian purposes or merely for decorative uses, as in the cultivation of ornamental trees, shrubs and flowers.

Pomology, more properly called Fructiculture, is that department of it which relates to the culture of fruits; Arboriculture, that branch which relates to the culture of ornamental trees, and Floriculture, the branch which relates to the culture of flowers.

Horticulture is really a branch of agriculture, though custom and, to a certain extent, convenience, maintain a distinction between

them. Both are governed by the same general principles. In horticulture, however, the plant is more often subjected to artificial conditions, for example, to stove heat, root-pruning, budding, grafting, layering, forcing, and so on.

The proper study of both includes in its scope the commercial history, systematic relationships, life histories, structure, physiology and pathology of the plants cultivated.

Of these physiology takes the leading rank both in its importance and in its scope. It includes not only the study of plant foods and the modes of their assimilation, respiration, metabolism, reproduction, and the influence of various external agents and conditions, as light, heat, soil, drainage, etc., on plants in general, but the study of all these in reference to each particular variety or species under cultivation, and as subject to more or less artificial conditions. The kinds of soil and drainage best suited to the plant, the best manures to employ, the proper order of cropping to prevent exhaustion of the soil, these are things also which are not to be neglected. Of scarcely less importance is a knowledge of the facts and conditions of plant variation, the laws and methods of hybridization, and the modes of taking advantage of these for the improvement of plants in any desired direction. Nothing, in fact, that has happened recently has so stimulated the agricultural arts or encouraged so much hope for future progress in them, as the revelations of the last twenty-five years in vegetable physiology.

The pathology of cultivated plants, that is the nature of the bacterial and fungous diseases to which they are liable, and that of the insect pests that attack them, together with the knowledge we are acquiring slowly but surely of the best methods of dealing with these enemies, is of scarcely less practical importance. It is a subject also which at the present time is engaging the talents of many of our best botanical investigators.

Forestry is a comparatively new, though none the less thriving and important branch of economic botany. Besides including a knowledge of the structure, botanical relationships, physiology and pathology of trees, it deals with such subjects as the best modes of planting, caring for and preserving forest growths, of re-foresting denuded areas, of estimating by means of accurate tests the relative values of different timbers for constructive and other purposes, the rate of forest growth, the age attained by different species of trees,

the relations of timbered areas to rainfall, to drainage, to the health of the population and to the permanence of the configuration of the earth's surface, the methods of preventing the encroachment of sand dunes upon fertile areas, and the introduction and acclimatization of new species of trees.

In many of the older countries of Europe schools of forestry have been established and systematic measures are employed for the care and preservation of the forests. In Germany and France forestry has become a profession, which gives employment to a considerable number of intelligent men. In this country we have permitted the destruction of a very large share of our forest wealth—a wealth greater probably than that of any other nation in the world—and we are only now awaking to a sense of the loss and beginning to take measures to prevent further destruction.

Although the means thus far adopted are quite inadequate, they form an entering wedge to further action, and the splendid work that has been done by Sargent and Fernald has so awakened intelligent public sentiment that we may hope for satisfactory legislation on the subject in the near future.

Pharmaceutical or medical botany, the branch which most directly concerns us, is in some respects behind the other departments in its development; in others, however, it is fully abreast of them. Although general botany owes more to this branch than to any other, since the earlier botanists were mostly either physicians or pharmacists and since the earliest botanical gardens were established chiefly for the cultivation of medicinal plants, medical botany is behind the age in the cultivation and improvement of the plants with which it deals. There are still a very large number of important medicinal plants that are either not cultivated at all, or are cultivated to such a limited extent that we are still dependent for our supplies of them on the primitive forests and prairies. Our agricultural colleges and experiment stations leave the medicinal plants almost wholly out of account, and excepting the case of the Cinchonas and a very few other drugs, experiments with them are left entirely to individual enterprise.

It is behind the agricultural branches also, in the fact that inadequate attention has been given to the study of the structure of the plants with which it deals. True, there are signs of awakening in this direction and a hope for better things in the near future.

As respects the physiology of medicinal plants and particularly that important branch of it which relates to the increase and improvement of the yield of medicinal constituents, nothing more encouraging may be said than that it is sadly neglected, the schools, even those of pharmacy, having ignored the subject altogether.

In two or three lines only does this department appear to have kept abreast of agricultural and horticultural botany. This is, perhaps, the case with vegetable histology, and it is decidedly the fact with the investigation of the chemical constituents of plants. Since the German apothecary, Sertürner, in 1817, announced the discovery and isolation of the first known alkaloid, morphine, there has been in our profession increasing activity in this line of research, and never has there been such widespread interest in the subject as at present. To the credit of this college it should be said that it has done its full share of work of this character.

But what has been done—valuable as it is—is only an infinitesimal part of what remains to do. That may not be wholly true which Emerson suggests, that every weed is a plant, the uses of which we do not yet understand, but it is safe enough to say that amongst the 175,000 or thereabouts of plant species that have been described and named, and the possibly as many more that await discovery, there are many times the number we know of at present that are capable of serving mankind in a useful way. We know not what value may lie even in many of the despised weeds about us, to be revealed by careful chemical research. Every day we are discovering new vegetable principles and discovering new uses for old ones. If such wealth as the aniline dyes came from such an unpromising and apparently worthless substance as coal tar, what may we not hope from the many thousands of plants that are scarcely known to us yet, except by name? Of the flowering plants that remain to be discovered we cannot count on more than from 10,000 to 12,000 species, but these give great promise, because they lie mostly in the great central regions of Africa and Asia, where plants of much potency may be expected to occur.

The least explored botanical fields are those of fungi and bacteria. How many species of these groups remain to be described it is impossible even to guess. We can only say that the number is vast, and possibly when all are known may be found to exceed that of all other plants put together. The probabilities of

obtaining many important remedial agents from each of these groups are most encouraging to investigators. Many of the fungi are proven to be palatable, highly nutritious and easily cultivated food plants, and it is largely suspicion and ignorance that prevents us from making more common use of them. The many poisonous species have made the whole group suspected, but this fact should encourage rather than retard pharmaceutical research, for dangerous poisons have often proven useful remedies.

As for bacteriology, so closely and directly is its study related to human welfare, and so important are its achievements in recent years that it is well entitled to rank as a separate branch of economic botany. Its achievements in the score of years of its existence have been vast, but we may hope for much greater results in the future.

According to Sturtevant there are 1,192 species of plants that have at one time or other been cultivated for food, and the whole number which are known to have been used as food, including those resorted to in time of famine, is 4,090 species, but even the smaller of these includes many plants of little value. I find even in Smith's Dictionary of Economic Plants only 515 food plants mentioned, and this certainly would include all of the important kinds. Even of these I judge at least two-thirds have either a very doubtful value or only a local or very limited use. The great food staples of the world are really few in number, but there seems no good reason why they should not be increased many fold, not merely by discovery of new kinds, but by the improvement of old ones. If it is true, as some botanists believe, that wheat in its numerous varieties, now constituting probably the most important food of the human race, was originally derived from *Ægilops ovata*, a grass of little consequence in its wild state even as a forage plant, what possibilities are presented by numerous other grasses, if only they could be subjected to intelligent cultivation?

A man walking along the coast of England or France may to-day find a tall, straight-stemmed, glaucous-leaved crucifer, which bears at its apex a compact raceme of yellow flowers. Its leaves are lobed and somewhat wavy or crispate, and the stem, when stripped of them and dried, would make a fair walking-stick. The plant is the wild *Brassica oleraceæ*, from which have been developed the common white cabbage, red cabbage, Savoy, coleworts, the borecole or Scotch kale, curly greens, cauliflower, broccoli, kohl-

rabi, the cow or Jersey cabbage, and as some believe, the common turnip, forms in appearance and habit often so different from each other, that no one not a botanist would suspect their common origin. Precisely how they originated we don't know; but they are the result of a long course of cultivation. Are there no other of our Cruciferæ that possess similar possibilities?

A few years ago there were enumerated in the transactions of one of the horticultural societies of Great Britain, 1,500 different varieties of the apple, and this probably does not include nearly all that have been produced from the original wild apple of Europe and Asia. Many other species of *Pyrus* that have never been subjected to experiment, possess, for aught we know, as much promise as *Pyrus Malus*.

The Japanese have made out of their persimmon what they regard as their most valuable cultivated fruit, but the wild plant, I am told, yields a fruit no more desirable than those of our two wild species. In fact, our common persimmon shows a great tendency to variation, even in the wild state, thus making it a most promising subject for experiment. Scarcely less urgently do the Butternut, Black Walnut, Hickories, Hazels, Blueberries, Serviceberry, some of the Shepherdias, the species of *Physalis*, *Apios tuberosa*, *Psoralea esculenta* and many other native species, invite us to experiment.

Of course, experiments of this kind must be made by government and in long lines of policy, as important results in the case of long-lived plants at least could not be expected in a single generation of men. It is not necessary to suppose, however, that because it has taken thousands of years to bring about the present excellence of many of our food plants, it would take the same length of time to similarly improve our wild ones. What was accomplished unintelligently in long ages might probably be done in a few generations by taking advantage of the now known laws of variation, hybridizing and artificial selection.

Coming again to medicinal plants, I find that the last edition of the U. S. Dispensatory enumerates over 1,300 that are more or less employed in medicine, and a fair estimate of the whole number in use, I think, would be not far from 3,000. This, of course, would not include all that have been employed in medicine; it would be impossible, even approximately, to estimate these; but only those plants that are at the present time more or less habitually employed

by man, either civilized or savage. Of these, probably the great majority are worthless or nearly so for the purposes for which they are employed. Even of those mentioned in the Dispensatory, only 244 are regarded as of sufficient value to be given a place in the Pharmacopœia of 1890, and some of these, I am sure, are retained, not because of their intrinsic worth, so much as because they are extensively used.

But taking the pharmacopœial plants as representing fairly well those at present approved by the intelligence of mankind, how small a proportion must it be of those that will ultimately be proved valuable! How small a portion of the earth's flora has been investigated even superficially, with reference either to medicinal constituents or physiological action! Even among the drugs that have been studied to some extent with reference to these points, in how few cases has the work been done in an exhaustive or thorough way! The greater the amount of study given to the chemical principles of plants, the more we realize how endless is the variety and how great the probabilities are that vast numbers of undiscovered ones yet exist that may prove of inestimable value to mankind.

In the line of cultivation of medicinal plants, with the view to their improvement, just enough has been done to prove the importance of further work in the same direction. Owing to the imminent danger that the destructive methods of gathering *Cinchona* barks in South America would soon lead to the extermination of these trees, the necessity for cultivating them arose a few decades ago, and experiments were begun in India and elsewhere on a large scale, and with most interesting and suggestive results. It has been found that by careful selection of favorable species, by crossing and again selecting favorable variations, barks may be produced which yield double or even treble the quantity of alkaloids produced by the best varieties from wild trees in their native Andes. Therefore, by precisely the methods employed by the floriculturist and pomologist, the drug gardener may improve the medicinal plants he cultivates.

Only one other line of development will I occupy a moment in directing attention to, and that is, the possibilities that lie in the micro-chemical study of drugs. The methods of macro-chemical investigation are under such headway that creditable work is being done by them in chemical laboratories the world over; but only quite recently have micro-chemical methods risen to prominence. It



is now possible, by means of the microscope, to recognize with certainty the presence of a large number of important medicinal constituents, including many of the alkaloids and glucosides. In many cases, to one skilled in the use of the microscope, it constitutes the simplest and speediest mode of analyzing a drug qualitatively. Among the glucosides that are recognizable by this means are coniferin, datiscin, frangulin, hesperidin, phloridzin, rutin, salicin and saponin; and among the alkaloids, aconitine, atropine, berberine, brucine, colchicine, corydaline, cytisine, morphine, narcotine, narceine, piperine, strychnine, theobromine, caffeine, veratrine and nicotine.

The microscope, in the hands of the intelligent pharmacist, is thus destined to become a much more important instrument than heretofore in identifying drugs, judging of their quality and detecting adulterations.

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## OAK WOOD AND BARK.

BY WM. B. THOMPSON.

It is asserted that oak timber of the present, particularly in England, is not the equal in durability to that of a former period. If the wood has deteriorated is it not likely that the bark, too, has become inferior? Tanning barks, especially of the oaks, play an important role in the arts. An exhaustive examination of the various derivatives of the universal astringent principle of vegetable substance—tannin—in its natural combinations, shows great variation in the respective yield, which variation is influenced by climate, soil, culture, season-periods and other causes. As these agencies change or become modified by further circumstances, the time will, no doubt, arrive when some natural productions of the vegetable kingdom may be so diminished in amount and quality of product as to cause serious inconvenience. One chief source of error in the cultivation of trees and plants exists in the fact that we do not adhere with sufficient exactness to the processes which Nature in her laws has wisely established for the fulfilment of her designs. The agriculturist, in the cultivation of his arborous and other trees, aims to produce, with growth, points of beauty. Nature does this too, but unlike the man, she never sacrifices the utilities to the pleasing attributes. The germination of seed, and the means by which healthful, progressive growth is secured, is a subject which may and can be

better comprehended. The acorn falls upon the *surface* of the ground, and the natural processes take care of it there. Man buries the seed of the oak, and the probabilities are that he blunders in doing so. An examination of a sprouting nut will show that this growth tends downward, as if in an effort to reach the soil, whilst the acorn lies on its side, though even then the little tubercule which is ultimately to become the tree, keeps its apex upward. This makes it evident that this part of the process, at least, should be performed in the air and light, that is when it is done as Nature intended. It is usually considered that during the fermentative part of the process of germination—the earliest stage—light should be excluded. This cannot apply, however, to the seed of the oak, because that part of the process is performed before the shell is ruptured. Now, the conditions which surround the starting point of vegetable growth are good subjects to study, and are also matters which cannot be treated with indifference, or in ignorance, if we propose to attain good results. Just what bearing the air-grown and the earth-grown processes have, relatively, upon the fibre and the heart of oak, it would be of much interest and value to know. A buried acorn somehow strives to get to the surface, and when there, this is noticed—that the cotyledons acquire a greenish tinge of color which they do not have when buried. Does this not furnish some significant information? Is it not known that in all etiolate plants, when compared with the same species which have been air-grown as it were, or grown in the sunbeams, are wanting in *carbon* and *astringency*—the very essentials in which the now perishable wood of oak is so markedly deficient. Is not our blanched celery of the table an illustration of this also? We have soft, tender threads and much succulency. So in the artificially grown oak we have a loose texture and a weak fibre. Think for a moment of the wood of oak enduring in use five hundred years! Start growth wisely and well, the timber, and parts will be good; the tree may be gnarled, stunted, deformed in comparison with lines of grace, symmetry and beauty in limb and branch, but the durability will nevertheless be there, and the traditions of the staunch old oak still be a boast of our time.

## THE PRESENCE OF LEAD IN TARTRATES.

By F. W. HAUSSMANN.

At a former meeting, while discussing the subject of lead in citrates, the suggestion was made that similar results to those stated could perhaps be obtained by an investigation of commercial tartrates.

Acting upon this suggestion, the writer made a number of examinations analogous to those described in the treatise upon lead in citrates.

### TARTARIC ACID.

Tartaric acid, as occurring in commerce, is seldom in the original crystalline state, the powdered article being almost exclusively found in the shops.

Due to this, the presence of particles of metallic lead is less frequently noticed than in the case of citric acid, although tartaric acid, being crystallized in lead-lined tanks, is also liable to the same impurity.

The Pharmacopœia likewise calls attention to this fact, giving the necessary tests for the detection of metallic impurities in the commercial acid.

To determine whether the tartaric acid of commerce also contained metallic lead, rather large amounts, obtained from different sources, were dissolved in water and allowed to stand.

A few metallic particles were found deposited in most cases, which, upon treatment with nitric acid and subsequent application of reagents for lead, indicated the nature of the deposits.

The solutions, when examined, also frequently gave indications of traces of the metal in soluble form.

Trials were also made, as in the case of citric acid, to ascertain the extent of the action of tartaric acid upon the metal.

Some lead particles were left in contact with an aqueous solution of the acid for 12 hours.

The filtered solution, examined according to the pharmacopœial directions, prominently revealed the metal to have passed into solution.

### COMMERCIAL TARTRATES.

As a rule, the tartrates of commerce appear to possess a greater degree of purity than the citrates.

This statement is based on the fact that in the writer's experience the reactions obtained for lead in tartrates were considerably less prominent than in the case of citrates.

Those of greatest importance to the pharmacist and most demanded by the public are potassium bitartrate or cream of tartar, potassium and sodium tartrate or Rochelle salt, and the neutral tartrate of potassium.

#### POTASSIUM BITARTRATE.

The cream of tartar of commerce does not appear to be perfectly free from metallic impurities, which is probably due to its method of preparation.

Several samples, on being subjected to the pharmacopœial tests, revealed the presence of traces of lead.

This is, however, not to the same extent as found in the case of commercial citrates.

Other samples again, when subjected to an examination, gave perfectly negative results as to any metallic presence.

#### ROCHELLE SALT.

Some ten samples of this salt were subjected to the various tests for lead, none of which gave any indication whatever of its presence.

The Rochelle salt of commerce appears to possess a high degree of purity, in the crystalline as well as the powdered state.

In connection with this it may be stated that the contents of a number of Seidlitz powders were also examined.

While the contents of the white acid papers occasionally showed small particles of metallic lead, in a few cases also giving indication of its presence in solution, those of the blue Rochelle salt papers were found to be free from the same.

A similar statement can also be made regarding the Seidlitz mixture of commerce, which, while occasionally varying in composition, is free from any metallic presence.

To determine whether tartrates exerted any action upon metallic lead, a number of particles of the metal were allowed to remain in contact with a 25 per cent. solution of Rochelle salt. This solution was found to be perfectly neutral as well as free from lead.

After a contact of six hours, the solution was examined and

revealed an abundance of lead in a soluble form upon the addition of ammonium sulphide solution.

On prolonged contact, as the lead passes into solution, the mixture becomes alkaline, changing the color of red litmus as well as turning red with phenolphthalein test solution. This would indicate the liberation of an alkali hydrate.

The same observation was also made with the citrates of lithium and potassium.

#### POTASSIUM TARTRATE.

This salt is rarely employed in medicine, not being official.

In the Pharmacopœia of 1880 it was used in the preparation of Fehling's solution.

Of the commercial tartrates examined, this salt was the only one which showed the presence of an appreciable amount of lead in a soluble form. Particles of metallic lead were not found. The three samples examined gave decided reactions for lead.

#### LEAD TARTRATE.

If the conjecture is correct, that in the latter salt the lead exists in the form of tartrate, it may be of interest to inquire into the character of this compound.

Trials to determine its nature were made similar to those described in connection with citrate of lead.

Several forms of lead tartrate exist according to Watts' Dictionary of Chemistry.

To determine the solubility of this salt it was first attempted to prepare the same by saturating a concentrated aqueous solution of tartaric acid with lead carbonate, keeping the mixture at the boiling point during saturation.

The mixture was allowed to stand some time before it was examined.

The tartaric filtrate, separated from the precipitated salt, unlike in the case of citric acid, gave but slight indication of the presence of lead, not the heavy precipitates as found in the case of the citrate.

This would indicate that tartrate of lead is but slightly soluble in water, considerably less so than the corresponding citrate.

This is confirmed by an examination of the precipitated salt.

#### PRECIPITATED SALT.

According to the above-cited authority the monoplumbic salt, prepared by the precipitation of a soluble lead salt by means of tar-

taric acid is white, crystalline, soluble in nitric acid and an excess of tartaric acid, also in a solution of ammonium tartrate, in which it solidifies to a gelatinous mass on concentration.

The salt was prepared by the writer by precipitating both lead nitrate and acetate with potassium tartrate.

Thus prepared, the salt is almost completely insoluble in water, in which it differs, as already stated, from the citrate.

It is readily soluble in dilute nitric acid, less so in acetic acid, but dissolves to some extent in a concentrated solution of any soluble tartrate.

The degree of concentration apparently influences the solubility to an extent.

If such a solution is allowed to stand, the lead salt is slowly reprecipitated.

This also takes place if the concentrated solution is diluted with water.

The fact that insoluble tartrates dissolve in the presence of alkali tartrates is illustrated in the case of cream of tartar, which contains calcium tartrate, and is doubtless present due to this cause.

Singularly, lead tartrate is readily soluble in a solution of potassium citrate, from which, however, it soon reprecipitates on standing, as in the case of citrate of lead.

To summarize, the following statements may be made regarding commercial tartrates:

Tartrates prepared directly from the acid are more liable to the presence of lead than when prepared from cream of tartar or similar sources.

This has been the writer's experience, while preparing a series of alkali tartrates for comparison with the commercial salts, and for determining the solubility of the lead salt.

Cream of tartar apparently possesses a greater degree of purity as regards the presence of metals than tartaric acid.

Finally, the citrates appear to be more liable to contain lead than the tartrates.

This is readily explained, as the former are usually prepared directly from the acid, while in the case of tartrates, cream of tartar appears to be the source from which they are prepared on the commercial scale.

# FOUR OAK BARKS FROM INDIA.

BY HENRY TRIMBLE.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy.  
No. 136.

Some months ago, through the kindness of David Hooper, there were received from A. E. Wild, in the British service at Dehra Dún, India, the following oak barks:

- Quercus annulata* (Inai).
- " *incana* (Ban).
- " *dilatata* (Moru).
- " *semicarpifolia* (Karshu).

After reserving samples of each for cabinet specimens, the amount of material for investigation was necessarily small.

The bark from each of the four species was estimated for tannin by the "hide" method. The moisture was also determined in each case, so that the results of the tannin estimations might be stated on the absolutely dry bark, in order to facilitate comparison.

The results in per cent. were as follows:

Species.	Tannin in air-dry bark.	Moisture.	Tannin in absolutely dry bark.	Ash in absolutely dry bark.
<i>Quercus annulata</i> , . . . . .	11.37	6.85	12.20	11.30
" <i>dilatata</i> , . . . . .	7.40	6.88	7.94	10.02
" <i>incana</i> , . . . . .	22.12	5.31	23.36	11.06
" <i>semicarpifolia</i> , . . . . .	7.99	7.04	8.60	10.88

In order to separate the tannin from the different barks for the purpose of more closely examining it, they were reduced to powder and exhausted with acetone. The solvent was recovered by distillation.

The residues of these acetone extracts were in all cases very largely soluble in water, with which they were treated for the purpose of separating resin and phlobaphene. After filtration, acetic ether was used to remove the tannin, but only in the case of the the bark from *Q. semicarpifolia* was there a notable residue left upon the evaporation of the solvent.

These residues were treated with water, the solutions filtered and agitated with acetic ether, which again removed the tannin. This process was repeated until the tannin was completely soluble in water.

On account of the small amount of bark and the readiness with which the tannin changed to anhydride, the former could not be obtained from the first three species in a state of purity to warrant ultimate analysis. Attempts to prepare it purer by other methods

involving the use of lead acetate, and of sodium chloride and acetic ether, afforded no better success.

The tannin of *Q. semicarpifolia* was dissolved in a mixture of ether and alcohol, the solution filtered and distilled to dryness under reduced pressure, by which means the substance was rendered quite porous. After treating the thoroughly dried tannin with absolute ether to remove resin and crystalline substances, it was again made porous by dissolving in ether and alcohol, and recovering the solvents under diminished pressure. The tannin so obtained had a light reddish-yellow color and was completely and readily soluble in water.

One per cent. solutions of the tannin from the different species reacted as follows:

REAGENT.	<i>Quercus annulata.</i>	<i>Quercus dilatata.</i>	<i>Quercus incana.</i>	<i>Quercus semicarpifolia.</i>
Boiled with dilute sulphuric acid, . . . . .	red phlo-baphene.	red phlo-baphene	red phlo-baphene	red phlo-baphene
Ferric acetate, . . . . .	brownish-green ppt.	brownish-green ppt.	green ppt. and color	green ppt. and color
Bromine water, . . . . .	yellow ppt. turning brown	yellow ppt. turning brown	yellow ppt. turning brown and black	yellow ppt.
Ferric chloride and Ammon. hydrate } . . . . .	dark green ppt. dark purple ppt.	brownish-green ppt. dark purplish-brown ppt.	brownish-green ppt. brown ppt.	green color and ppt. purplish-brown ppt.
Ammonio-ferric sulphate, . . . . .	dark green ppt., brownish color	brownish-green ppt. and color	bluish-green color, green ppt.	green color and ppt.
Lime water, . . . . .	brownish-yellow ppt., darkening	brownish-yellow ppt., becoming purple	brownish-yellow ppt. darkening	yellowish ppt. turning pink
Nitrous-acid, . . . . .	brown ppt.,	brown ppt.,	brownish-black ppt.	brownish-yellow ppt.
Sodium sulphite, . . . . .	reddish-brown ppt.	purplish-brown ppt.	brownish-purple ppt.	yellow color
Stannous chloride and hydrochloric acid, . . . . .	slight reddening of color	slight reddening of color.	slight reddening of color	pink color
Pine wood and hydrochloric acid, . . . . .	violet color	violet color	violet color	violet color
Potassium bichromate,	heavy brown ppt.	heavy brown ppt.	heavy brown ppt.	heavy brown ppt.



The tests in general became darker on account of the coloring matter associated with the tannin.

The following results were obtained by submitting the tannin of *Quercus semicarpifolia* to combustion:

	Per cent.
Carbon, . . . . .	60.15
Hydrogen, . . . . .	5.19
Oxygen, . . . . .	34.66

The similarity in behavior toward reagents indicated the tannin from these four barks to be identical with one another, and with that from several species of oaks indigenous to this country, recently investigated by the author. The ultimate analysis of the tannin from one of the above samples confirms the opinion that in them we have a tannin identical with that from our own species.

Two of the samples exceed in tanning capacity the bark from any of the American oaks, while the other two are equal to the average of our own.

## MEMOIR OF WILLIAM B. WEBB.

William Barber Webb, for many years a member of the Board of Trustees of the Philadelphia College of Pharmacy, deceased suddenly at his home in this city, on the tenth day of February, 1894, in the 70th year of his age.

He was born in York, Pa., September 6, 1824. The first fifteen years of his life were passed in his native city, amid the comforts and happy associations of the domestic circle.

His father, James Barber Webb, was a man of intelligence, interested in literature and science; he made a companion of his son, and directed him in his selection of reading, and William thus, at an early age, acquired a knowledge of the writings of many standard authors. This early training was of great service to the improvement of his mind, as he had subsequently but few advantages in schooling.

When William was fifteen years of age, his father died, and the widowed mother and three children found themselves deprived, by the dishonorable acts of others, of the property which they should have inherited.

Laying aside his former comforts and habits, the boy commenced a life of self-denial. He gave up school, and sought for some occu-

pation which would afford him a support. Going to Baltimore, he found employment with Coleman & Buchanan (afterwards Coleman & Rodgers), druggists.

Here he remained until an attack of sickness rendered necessary his return home. On regaining his health he was apprenticed to a tinsmith, but, not satisfied with this position, it was soon abandoned.

In 1842, he again left York, with the intention of looking for employment. He went first to Baltimore and obtained a letter of introduction from Mr. Coleman, his former employer, to Charles Ellis of this city.

Arriving in Philadelphia without friends or acquaintances, and with only sufficient money for his support for one week, he called on Chas. Ellis, who informed him that he was not in need of a boy, and recommended him to call on Caleb Needles, at Twelfth and Race Streets, and furnished him with a letter of introduction.

On calling to see Mr. Needles he found, to his disappointment, that he was absent from the city. Edward Needles, father of Caleb, had an interview with him, and was pleased with his manner and earnest desire to find a place which would afford him an opportunity to show what was in him. He advised him to await the return of his son, whom he thought would engage his services.

William felt that he could not afford to spend what little money he had in waiting, and told Edward Neeles his financial situation, and how important it was for him to go to work at once. Listening with interest to his account of himself and becoming interested in the boy, Edward Needles, after consultation with his wife, invited him to stay with them until the return of Caleb, and work in the store, feeling confident that his son, who was in want of an apprentice, would find in William one who would suit him.

It was fortunate for William, in the commencement of his career, to have met with such fatherly kindness as was extended to him by Edward Needles, and the remembrance of this was gratefully cherished by him throughout his life.

On the return of Caleb Needles, William was engaged as an apprentice, and by his application and industry became an expert in the business which he afterwards conducted successfully for nearly fifty years.

After graduating from the Philadelphia College of Pharmacy in

1845, he remained with his employer until 1846 or 1847, when Edward Needles established him in business at Tenth and Spring Garden Streets, where he remained until 1886, when he retired from business. His early religious training was in the Presbyterian Church, to which denomination his parents were attached.

In 1852, he united himself with the Society of Friends, to which religious body he became much attached, and after his retirement from business devoted a large portion of his time and energy to work pertaining to the Society. His religious views were not displayed in words, or by formal professions, but became a part of his daily life, governing his conduct and dealings with his fellow-men.

In 1853, he married Rebecca Turner, of Baltimore, and the subsequent forty years of his life were passed in the congenial society of his wife and four daughters, all of whom survive him.

Convinced in early life of the unchristian character of negro slavery, he was an earnest advocate for the extinction of human bondage, and labored earnestly in the cause at times when courage was required to denounce the system.

In a quiet way he advocated the cause of temperance, discouraging the use of liquor both in public and private life, and by his precept and example was able to extend a reforming influence over this habit. In later life he became a prohibitionist, feeling it to be his duty as a citizen and Christian man to do all in his power to restrict the evils arising from intemperance.

His connection with the College has been one of active and efficient service. He was elected to membership in October, 1857, and in March, 1873, to the Board of Trustees. On the decease of Samuel Bunting in 1890, he was elected unanimously to succeed him as Treasurer of the College, a trust which he held up to the time of his decease, discharging the duties confided to him with carefulness and accuracy.

Although no longer engaged in the practice of pharmacy, he retained a lively interest in the education of those who had made choice of this profession, and devoted a large measure of his time to the educational work of the College.

In 1887 the Degree of Master in Pharmacy was conferred upon him by the College in recognition of his long and honorable service in the profession of pharmacy.

As a pharmacist, he earned a well-deserved reputation for skill

and accuracy, while his conscientious views of the responsibilities of his calling gained for him the confidence of the medical profession as well as that of his brother pharmacists.

Amiable in his intercourse, honorable in all his business transactions, ever ready to acknowledge an error in his judgment, his word was accepted by all who knew him as free from all dissimulation. The boy was father to the man, and in the record of his 70 years we have an example of a successful, useful and honorable life, resulting from habits of industry, self-denial and patient perseverance.

His mental activity was unimpaired, and his desire for active service which would benefit his fellow-men continued as a characteristic trait until the hour when he was suddenly summoned "to cease from his labors."

To some of his friends he was wont, in his latter years, to review the events of his life, and would contrast the habits of the present rising generation with those of his early days. He deprecated the growing ambition of the present rising generation to attain an early fortune, as displacing the motives which render life useful and ennobling.

"'Tis meet that we should pause awhile  
Ere we put off this mortal coil,  
And in the stillness of old age  
Muse on our earthly pilgrimage."

C. B.

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## RECENT CONTRIBUTIONS TO PHARMACY.

### HYDRASTIS CANADENSIS.

Of the alkaloids of this rhizome, hydrastine and berberine have been quite thoroughly studied, but other alkaloidal constituents, while claimed as long ago as 1873, have provoked numerous contradictory statements. A. K. Hale first announced the existence of a third alkaloid in hydrastis, which was isolated from the mother-liquors of the alkaloid hydrastine; Prescott—and later, Burt—confirmed the presence of this new alkaloid and increased our knowledge of the same; H. Lerchen isolated an alkaloid which he called *xanthopuccine*, and which is probably the same as that discovered by Hale; Lloyd and Power, however, doubted the existence of this third alkaloid. In 1888 E. Wilhelm isolated a small quantity of an alkaloid, for which the name *canadine* was proposed, and in 1891 E.

Schmidt announced that this same alkaloid in some quantity had been placed at his disposal by E. Merck, and that it had also been prepared by himself from the rhizome. The investigations carried on by E. Schmidt and some of his pupils during the past ten years enable him to say that, while hydrastine and berberine are the chief alkaloids present, they do not by any means represent the entire alkaloids; the quantities in which these other alkaloids are present in the rhizome are so small that by successive workings of 50 kilos only one of these alkaloids has been prepared in larger quantity; the alkaloid so obtained, very probably identical with that reported by Hale, Prescott, Burt and Lerchen, is called *canadine* in preference to the name *xanthopuccine*, because the latter name, indicating a yellow color, is erroneous, as neither the alkaloid nor its salts are yellow.

L. Deichmann, working with this alkaloid, furnished as hydrochlorate by E. Merck, pronounced it to be, in all probability, *dihydromethylberberine*,  $C_{21}H_{21}NO_4$ . After the conclusion of this investigation, a much larger quantity of canadine hydrochlorate was presented by E. Merck to Prof. E. Schmidt, and the investigations of the latter are now to be recorded as published in Arch. der Pharm., 1894, 136-154.

The isolation of the crude canadine is attended with but one difficulty, namely, its minute quantity; one kilo of the rhizome being sufficient to prove that, besides hydrastine and berberine, a third alkaloid is present. Crude hydrastine, obtained by precipitating with ammonia the concentrated decoctions made by extracting the rhizome with water acidulated with acetic acid, is used in isolating the canadine; after washing and expressing the grayish-brown crude hydrastine, it is dissolved in dilute sulphuric acid, filtered, mixed with some nitric acid and set aside for one or two days; the precipitate which is formed is dissolved in hot water and the alkaloid precipitated by adding ammonia; the precipitate is redissolved in dilute mixed with sulphuric acid and nitric acid. These operations are repeated until the precipitate caused by the nitric acid is perfectly crystalline and only shows a faint yellow tinge; from the almost insoluble nitrate the alkaloid is precipitated, which is then purified by crystallization, first from boiling petroleum-ether, later from alcohol. The white, acicular crystals so obtained melted at  $132-133^{\circ}C.$ , and had all the characteristics of a definite chemical compound, but by

combustion gave results quite different from those obtained by Deichmann, so that the presence of another alkaloid (containing less carbon) in the material suggested itself. By forming the sulphate, recrystallizing this, then liberating the base and crystallizing from alcohol, the alkaloid was purified so that it now formed white, lustrous needles, melting at  $132.5^{\circ}$  C., insoluble in water, soluble in alcohol, ether, chloroform, benzol and hot petroleum-ether; exposed to light, it slowly becomes yellow; the alcoholic solution is neutral to litmus and phenolphthalein; this solution, also the solutions of the salts, are lævogyre; the nitrate, hydrochlorate and hydrobromate, especially in presence of an excess of the acids, are difficultly soluble; the sulphate, in being quite soluble, forms an exception to this behavior. The average of a number of combustions of the alkaloid, C 70.60, H 6.31 and N 4.13, and the analysis of its salts, indicate the formula  $C_{20}H_{21}NO_4$ , isomeric with that of *hydroberberine*. The tests for *canadine* are as follows:  $H_2SO_4$  dissolves it with a yellowish color, slowly taking a reddish tinge, and after long exposure to air the solution becomes milky-turbid;  $HNO_3$  dissolves it with a yellow color; Erdmann's and Froehde's reagents produce a transient, olive-green coloration, changing to brownish-red; vanadin-sulphuric acid dissolves it, forming an olive-green solution, changing to a black-brown. Canadine salts are *not* changed by ferric chloride nor by potassium ferrocyanide as stated by Prescott; in some respects the reactions of canadine resemble those of morphine, hydrastine, oxyacanthine and berbamine: Ferric chloride and potassium ferricyanide produce a blue-green coloration due to the formation of Prussian blue; iodic acid is reduced, liberating iodine; if a little bismuth sub-nitrate be sprinkled on a solution of canadine in strong sulphuric acid, a brown-black color is developed.

Of the salts of canadine the *sulphate*,  $C_{20}H_{21}NO_4 \cdot H_2SO_4$ , may be obtained anhydrous in large, colorless, tabular crystals or hydrated with one molecule water in the form of groups of yellowish needles; it was thought at first that there were here the sulphates of two alkaloids, but as in the recrystallization it was possible to get from both salts either hydrated or anhydrous crystals, and as the base separated from both were identical, this idea had to be given up. The *hydrochlorate*,  $C_{20}H_{21}NO_4 \cdot HCl$ , is obtained by adding HCl to the solution of the sulphate, when it may separate as a white crystalline precipitate, a translucent gelatinous mass, or more slowly

in small lustrous scales; exposure to light and air slowly develop a yellow color. The *nitrate*  $C_{20}H_{21}NO_4HNO_3$  obtained like the hydrochlorate, forms small, lustrous, white scales. Canadine-platinic chloride  $(C_{20}H_{21}NO_4HCl)_2PtCl_4$ , is obtained as a yellow amorphous precipitate. Canadine-auric chloride,  $C_{20}H_{21}NO_4HCl + AuCl_3$ , forms a red-brown flocculent precipitate. Methyl iodide at ordinary temperature unites with canadine, forming pale yellow crystals  $C_{20}H_{21}NO_4CH_3I$ , which melt at  $228-232^\circ C$ .

The behavior of canadine towards alkaloidal reagents, its change of color when exposed to light, and the fact that the mother-liquors of canadine sulphate exposed to light and air contained berberine sulphate, indicated the close relationship of these two alkaloids; another important observation in this connection was that iodine, acting upon the alcoholic solution of canadine, was decolorized, producing an intensely yellow-colored solution, from which an abundant separation of small yellow crystalline needles was noted after a short time. This deposit of crystals was found to consist of berberine hydriodate and the hydriodate of another base resembling canadine, but melting at  $140^\circ C$ . instead of  $132.5^\circ C$ . These reactions indicate that *canadine*  $C_{20}H_{21}NO_4$  is *tetrahydroberberine* (berberine  $C_{20}H_{17}NO_4$ ), and that the base just mentioned may be an intermediate product between canadine and berberine. From the action of iodine upon canadine at  $100^\circ C$ . were isolated golden-yellow, lustrous needles, agreeing in all respects with berberine hydriodate,  $C_{20}H_{17}NO_4HI$ ; from them derivatives were prepared, agreeing in all respects with berberine hydrochlorate and berberine aurichloride. By the action of zinc and sulphuric acid the yellow solutions of the hydrochlorate and hydriodate were nearly decolorized; ammonia separated from these solutions a gray-white, flocculent precipitate, which, after recrystallization from boiling alcohol, was dissolved in chloroform and covered with a layer of alcohol; the crystalline needles first formed were readily transformed into the octahedral form characteristic of hydroberberine, which were found to melt at  $166-167^\circ C$ ., thus demonstrating that canadine could be changed into the isomeric hydroberberine.

FRANK X. MOERK.

## EDITORIAL.

## THE THREE YEARS GRADED COURSE AT THE PHILADELPHIA COLLEGE OF PHARMACY.

The Philadelphia College of Pharmacy has again demonstrated her fitness to lead the institutions devoted to pharmaceutical education in this country, by requiring all who matriculate after this year to take three full courses of lectures. Like all advanced movements, it is not probable that adverse criticism will be escaped. Many of the older graduates will recall the opposition which was made to holding the Commencement in a public hall; but the progressive supporters of the College came to her aid and the opposition was vanquished. On nearly every occasion since, when some improvement has been demanded, the friends of progress could only win the day after strenuous efforts; but, as time wore on, and the College waxed stronger, and the success of the various advanced movements had been proved, ill-considered opposition was driven into the background, until now the College has little difficulty in inaugurating any reform which has been well considered, and which promises beneficial results for the advancement of American Pharmacy.

For many years the College has encouraged students to extend the time for acquiring a pharmaceutical education, by offering to all, the opportunity to attend a third course, without additional expense. The number of students availing themselves of this privilege has increased largely of late years, and it has often embraced some of the best students in the class.

Unfortunately the action of the real student and true lover of knowledge, who had sufficient foresight to realize the value of taking three years to complete his course, was likely to be misunderstood; and the fear of being scouted by his fellows, as too ignorant to accomplish in two years what others had done, deterred many from accepting the privilege. Then, again, a three-years-course student, under the old regime, felt that he was under some disadvantage in coming up for examinations with those members of his class who had failed to pass their examinations after a two years course, and were compelled *by necessity* to take three courses.

These, however, are minor reasons for the advanced step of three full courses; the grand moving cause is that sufficient time cannot be given in two courses, notwithstanding the lengthening of the same, to adequately present to the mind of the student the vast accumulation of facts which Pharmacy and its collateral sciences now embrace. Not only must more time be taken by the student to absorb the facts, but these, even if perfectly memorized, can never be considered to rise to the value of actual knowledge, unless sufficient time has been given for them to be assimilated and digested.

If additional time be the only factor, it might be said, why not lengthen the course, or largely increase the hours for work during each day? But those who advocate such views fail to grasp the importance of allowing the mind of the student sufficient time for that careful thought and deliberate study necessary for thoroughly mastering the vast number of facts now embodied in a knowledge of Pharmacy; by having these continually brought practically before the student and thoroughly examined, from many points of view, outside of the regular college lectures, a mere acquaintance or intellectual assent



soon develops into that actual knowledge which becomes a permanent part of the student's mental equipment.

These views having been practically accepted by the College, it became simply a matter of form for the Board of Trustees at its meeting in April to pass the resolutions which will make the three-years course compulsory after 1894. The College realizes, more thoroughly than ever before in its history, the responsibility involved in taking this important step. It will probably have the effect of cutting down the size of classes, and those who merely measure success by numbers may have an opportunity of quoting their prophecy that the movement was premature; but if the size of the class diminishes, the College will have the proud satisfaction of knowing that the quality has been improved, and the value of its Diploma will be still further enhanced. It is to be hoped that to those who successfully complete their three-years course, a more distinctive and appropriate reward than the title of graduate will be conferred by their Alma Mater.

J. P. R.

#### STATE ASSOCIATION.

Especial attention is called to the notice, in its appropriate place in this number, of the Pennsylvania Pharmaceutical Association. Every pharmacist in the State should attend the meeting, to be held in Reading on June 12th. Pharmacy has never made more rapid strides forward than since the formation of state associations, commenced some fifteen years ago. This led to a reorganization of the American Pharmaceutical Association, at its Cincinnati meeting, in 1887; and that body, becoming more representative, entered a period of usefulness which it had not previously enjoyed.

It is to be hoped that there will be no waning of the enthusiasm which has heretofore characterized the meetings of most state associations.

It is true that the business side of pharmacy has been, and still is, undergoing a change. The advent of the "cutter" has rendered a modification of business necessary. The pharmacist, in order to make a living, has been compelled to do more than blindly hand out the secret preparations of the proprietary manufacturer; he has had to educate himself; this education has, in part, been acquired through attendance at the state association meetings. First local formularies were issued, terminating in the publication of that valuable "National Formulary." The result of all this will be the doom of the "patent medicine." Let no one ignore the value of his state association, but join in, and in helping others he will be helping himself.

#### GENERAL REGISTER OF THE SILESIAN BOTANICAL CLUB OF EXCHANGE.

This list of exchange botanical specimens has now reached its twenty-sixth year of publication, and is under the directorship of S. Mayer, an apothecary of Mainburg, Lower Bavaria.

The catalogue is made up of a list of botanical specimens for exchange, and of the rules which govern the Society; the latter are given in the German and French languages, side by side.

The object of this Society is to aid botanists in all parts of the world to exchange with one another. No annual dues are charged, but a certain number of specimens are retained by the Society for effecting the exchange; for instance,

out of every hundred, fifteen are retained if they come from localities other than Austria or Germany. From these countries twenty specimens are reserved.

The list offered is a long and valuable one, and would evidently afford any botanist an excellent opportunity to enlarge his herbarium at a very small expense.

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The following hints in regard to "Drawings for Illustrations," from *Phar. Jour. Trans.*, 53, 860, so well explain the subject, that they are here reproduced in full :

"The simplest and most generally employed method of illustrating letter-press is by means of zinc blocks prepared by a photographic process from line drawings done with pen and ink. In one of the recent Cantor lectures delivered before the Society of Arts by Mr. Henry Blackburn, it was pointed out that drawings should be made upon bristol board, or paper with a similar surface, with black or Indian ink, that will dry with a dull surface, and a pen having a medium point. The drawings should consist entirely of clean and sharp lines, shading by means of washes being inadmissible. Photographs and shaded drawings are reproduced by a more elaborate process, which does not yield equally satisfactory results in rapid printing. In most cases it is desirable to prepare the drawings on a larger scale (one-third to one-half larger) than it is proposed to reproduce them. Sufficient allowance must then be made for the result of reduction, some lines being necessarily thickened, whilst the amount of reduction intended should be clearly indicated in the margin. In this way it is possible by means of a simple line drawing to efficiently illustrate the text of an article or paper—whether merely describing a piece of apparatus or other object of appreciable size, or representing the magnified image of minute structures as seen under the microscope—and contributors to the *Journal* are requested to adopt this plan when illustrations are necessary to elucidate the text of their contributions."

It is the desire of the editor of the *American Journal of Pharmacy* to have illustrations accompany the text, wherever they will aid in explaining it, and clear photographs will be accepted and reproduced. It is much better, however, to have a good artist first make line drawings from these photographs.

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On Thursday evening, May 3d, several hundred visitors at the Philadelphia College of Pharmacy examined a display of the specimens from the Martindale Herbarium.

The museum, library and reading-room were filled with improvised tables, so arranged that the specimens placed thereon were of just the right height and angle to be observed by the visitor while standing or walking. In this way the largest possible number of specimens were viewed during the time of the exhibition, from 8 until 11 o'clock.

During the two remaining days of the week the pupils of a number of schools in Philadelphia and vicinity availed themselves of the opportunity to see this collection.

#### LAVOISIER.

May 8th was the hundredth anniversary of the death of Lavoisier. His tragic death at the hands of the rabble of Paris, and the active part he took during life in founding many of our chemical laws, have made him one of the

most memorable figures in the history of chemistry. Recently the Society of Physics and Medicine at Amsterdam, appointed a committee to suggest and start a movement to commemorate his death.

Dr. Gustavus Hinrichs, of St. Louis, Mo., has undertaken, single handed, to start a movement in this country. He has, through a circular, appealed to his fellow chemists to form a large committee whose mission shall be to take such steps as will secure to the memory of Lavoisier a monument in Paris. Dr. Hinrichs is at present anxious to have names of those willing to serve on such a committee, and anyone interested can obtain more information by addressing him at 3132 Lafayette Avenue, St. Louis, Mo.

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The Pharmaceutical Society of Great Britain recently elected Sir Frederick A. Abel, Prof. Joseph P. Remington and Prof. Sidney Ringer honorary members; and Prof. Henry H. Rusby and Dr. George Watt corresponding members.

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The name of Charles Rice was inadvertently omitted from the list, in the Journal of last month, of those on whom the Philadelphia College of Pharmacy conferred the honorary degree of Master in Pharmacy at the Commencement in April.

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## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*Grundriss der Pharmakognosie.* Von F. A. Flückiger. Zweite, mit Berücksichtigung technisch wichtiger Pflanzen bearbeitete Auflage. Berlin, 1894. R. Gaertner's Verlagsbuchhandlung. Pp. 333.

Outlines of Pharmacognosy. Second edition.

The first edition of this valuable work was issued in 1884. This second edition again brings the subject up to date. Each drug is treated in a concise and clear manner, by first giving the name and synonym, then the origin, description and history. Not one word too many is used in briefly summing up the "quintessence" of information. By omitting all references of authority, the author has saved much room and confusion, although it does not aid one who wishes to look up the literature of the subject.

*Proceedings of the American Pharmaceutical Association*, at the forty-first Annual Meeting, held at Chicago, Ill., August, 1893. Philadelphia. 1893. Pp. 1,087.

The frontispiece of this volume is an excellent portrait of the late Professor Maisch; this is followed by the title page and four pages of a memorial. There is an unusual amount of good, original matter in the book, and an especially valuable Report on the Progress of Pharmacy. This Report is becoming a feature of the Proceedings, particularly as it is supplemented by an extensive bibliography. Two hundred and eighty-six members were registered as attending the meeting. The new members elected, numbered one hundred and thirty, and there were dropped from the roll, on account of death, resignation and the non-payment of dues, ninety-nine, showing an increase in membership, during the year, of thirty-one.

*Missouri Botanical Garden.* Fifth Annual Report. St. Louis, Mo. 1894. Published by the Board of Trustees. Pp. 166, and 32 plates.

The Director of the Garden, Dr. William Trelease, may be said to be the

author of this interesting and beautiful volume. It is made up of (1) Reports of the Officers and Director; (2) Anniversary Publications; (3) Scientific Papers. The last show considerable care and original research on the part of the authors. Three of the papers are of especial interest and value, viz.: "A Study of the Venation of the Species of *Salix* described in Gray's Manual, with Reference to their Determination," by Dr. N. M. Glatfelter. "Material for a Monograph on the Tannoids, with Special Reference to Vegetable Physiology," by J. Christian Bay, and "The Sugar Maples, with a Winter Synopsis of all North American Maples," by William Trelease. The Report is published for gratuitous distribution and exchange within certain limits, but may be purchased of the agents, Dr. A. E. Foote, of Philadelphia; W. Wesley & Son, of London, and R. Friedländer & Son, of Berlin.

*The Tannins, Vol. II.* By Henry Trimble, Ph.M.

A Monograph on the History, Preparation, Properties, Methods of Estimation and Uses of the Vegetable Astringents. J. B. Lippincott Company, Philadelphia. 12mo. Pp. 172.

The first volume, which appeared in December, 1891, was devoted to a general history of the tannins, the methods of extraction and estimation, and especially considered gallo-tannic acid. The second volume, now before us, is especially devoted to the tannins existing in the barks of the various species of oak, the mangrove, the canaigre and in the chestnut. It is an unusually interesting and carefully prepared monograph, treating the subjects in an instructing manner, and serves well as an illustration of the numerous fields in which chemists should specialize their study and investigations.

The first section of the volume treats of the sources of the oak tannins. A very commendable feature of this section is the brief descriptions of the distinguishing characters and well executed sketches of the leaves and acorns of our oaks of the Eastern United States, the barks of which have been generally examined by the author. The suggestion is ventured that a reference to these pages would enable the manufacturers to produce definite products by keeping separate the material and products from the various species of oaks.

The investigations of the author are particularly valuable, and accepted as authority, as in each instance the work was performed on material, the source and botanical origin of which was known, thus removing the uncertainty which attended most of the investigation in this field made in the past.

The second section gives the history of the oak tannins, and the various investigations from 1792 to date are briefly reviewed. The additions to the knowledge of this group are chronicled, and the source of some of the errors introduced in their work is pointed out and attention is directed to the discrepancies existing in the reported results. This concise resumé of the literature will be exceedingly useful to future investigators in the vegetable astringents, as it places in a compact form the information from the various scattered sources, many of which were not accessible to the average student. The various processes of preparation and purification of these tannins, as well as their properties and methods of estimation, are described, accompanied by criticisms, suggestions and improvements, as results of the original investigations of the author. These materially enhance the value of the work. Acetone is recommended as a solvent in the extraction in place of ether. The pure oak tannins

are shown to yield a *green* color with salts of iron, and not a *blue*, as generally stated.

The tannin from the Mangrove bark (*Rhizophora Mangle*, L.) is proved to be a catechol tannin closely allied to those of rhatany, canaigre and mimosa.

The seventh section is devoted to Canaigre tannin obtained from the tuberous roots of the *Rumex hymenosepalus* Torr. The author's investigations indicate its close relationship with the tannins existing in mangrove and rhatany. The extensive distribution of this plant in the Southwestern States and Territories and the ease with which it can be cultivated, and the large percentage of tannin contained in the roots, indicate that in the future it will be a valuable source of supply for tanning purposes.

The wood of the American Chestnut is stated to contain 7.85 per cent. of tannin, and the bark 7.31 per cent., and the reactions and elementary analysis point to its probable identity with gallo-tannic acid.

The index of the literature of the tannins continued from the first volume is also exceedingly valuable. The book is commended to those interested in the chemistry of the vegetable products, and especially to those who are practically engaged in the manufacture and application of these products in the industrial arts, such as dyeing and tanning.

G. M. B.

*Essentials of Practice of Pharmacy*, arranged in the form of Questions and Answers. Second edition. By Lucius E. Sayre, Ph.G. Philadelphia: W. B. Saunders. 1894. Pp. 200.

The new Pharmacopœia has made necessary a revision of this work. The author does not claim originality for this work, but an arrangement of pharmaceutical facts designed to give the student and quiz master some variety from the usual classification.

*Therapeutic Terms* for Pharmacists and Physicians. By H. M. Whelpley. M.D. St. Louis, Mo., 1894. Published by the author. Pp. 68.

Dr. Whelpley found, during his own studies, and while teaching medical and pharmaceutical students "that even large and expensive medical dictionaries failed to furnish definitions for all of the therapeutic terms of current literature." Therefore, he has collected in a handy volume much valuable information in the shape of concise definitions to words in use in pharmaceutical and medical science.

*Die Alkalien*. Darstellung der Fabrikation der gebräuchlichsten Kali- und Natron-Verbindungen, von Dr. S. Pick, Fabriksdirector. Zweite verbesserte Auflage. Wien: A. Hartleben's Verlag. 398 Seiten.

The Alkalies, description of the manufacture of the most commonly used Potassium and Sodium compounds. By Dr. S. Pick, Factory Director. Second revised edition. Vienna: A. Hartleben's Publishing House. Pp. 398.

The Hartleben Library, a series of technical chemical hand-books of portable size, has now reached Vol. 208, and covers a wide range of the applications of chemistry to the useful arts. The volume above quoted is one of the earlier of those which appeared a number of years ago, and has now been re-written and brought up to date. An examination of its pages shows that this has been done with reasonable fullness. Castner's improvements in the manufacture of metallic sodium have been included, and the account of the ammonio-soda

process and its more recent modifications, is quite satisfactory. We do not find anything, however, with regard to the recently proposed methods for the electrolytic preparation of caustic soda. It is true that these methods have hardly passed beyond the experimental stage as yet, but the chemical journals have for the past year or two contained abundant accounts of them. Under potassium chlorate, however, we find a recent electrolytic method, now in operation in Switzerland, described. A comparison of the hydrometer scales in current use is appended. The work forms a satisfactory reference book, moreover, in that it refers frequently to the original sources of information in journal literature.

S. P. S.

*Chemisch-technische Specialitäten und Geheimnisse mit Angabe ihrer Zusammensetzung nach den bewährtesten Chemikern*, von C. F. Capaun-Karlowa, Apotheker, u. s. w. Dritte vollständig umgearbeitete, vermehrte und verbesserte Auflage. Wien: A. Hartleben's Verlag. 252 Seiten.

Technical-chemical specialties and secrets, with a statement of their composition according to chemists of authority. By C. F. Capaun-Karlowa, Apothecary, etc. Third, completely re-written, enlarged and improved edition. Vienna: A. Hartleben's Publishing House. Pp. 252.

This work is like the volumes of chemical recipes and secret preparations that appear from time to time. It is alphabetically arranged, and includes such subjects as varnishes of all kinds, cements, alloys, flavoring essences, explosive mixtures, inks and similar preparations.

Such works have a rather restricted value, as the local conditions and names of these special preparations vary very greatly, and they rapidly pass out of use and are replaced by fresh novelties and patented articles.

The work has been brought down to date, and probably has value as a convenient reference book, fitted to the German conditions of to-day. S. P. S.

*Semi-Annual Report of Schimmel & Co.* Leipzig and New York. April, 1894. This pamphlet contains the statistics, prices and other commercial information in regard to essential oils, and also a fair amount of results of original research. A number of new oils have been prepared and examined by the firm; notably, those from mignonette root, golden rod, red cedar and grape fruit or shaddock.

*Analyse bactériologique et chimique des eaux.* Par A. Denæyer. Brussels, 1894.

Bacteriological and chemical analysis of water.

*Les peptones: leur composition, leur analyse.* Par A. Denæyer. Antwerp, 1894.

Peptones: their composition and analysis.

*Vierteljahresschrift über die Fortschritte auf dem Gebiete der Chemie der Nahrungs- und Genussmittel.* Achter Jahrgang. Viertes Heft (1893). Berlin, 1894. Verlag von Julius Springer.

*The Oils and Oleoresins of the U. S. Pharmacopæia, 1890.* A tabular statement compiled by Albert N. Doerschuk, Ph.G.

This table is printed on one sheet of heavy paper, 11 x 22, and contains much valuable information. Copies may be obtained at a nominal price by addressing Dr. H. M. Whelpley, care of Myers Brothers, Druggists, St. Louis, Mo.

## MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, May 15, 1894.

The meeting was called to order, Professor Trimble nominating Joseph W. England, Ph.G., as chairman.

The minutes of the last meeting were read and approved.

The Registrar presented, on behalf of Mr. John A. Pemberton, Prof. Asa Gray's work, "How Plants Grow."

Prof. E. S. Bastin read a very instructive and interesting paper, upon "Economic Botany," which he defined to be botany applied to the wants and uses of mankind. This is very fully illustrated in the adaptation and improvement of plants for food through the labors of scientific botanists.

In pharmacy we notice this remarkably in the Cinchonas of India, which are two or three times as rich in alkaloidal constituents as when first found in their native regions. The paper is published on p. 282, of this number.

The next paper was one on "Lead in Tartrates," as a continuation of the subject of "Lead in Citrates," which was read a few meetings since; as tartaric acid is rarely found in the original crystalline state in commerce, but nearly always in powdered form, the impurity is not so easily detected by physical means. Lead left in contact with a solution of tartaric acid will show evident signs of it in twelve hours. Rochelle salt is nearly always extremely pure, and in cream of tartar there is merely a trace; in Seidlitz powders the contents of the blue paper is nearly pure, while the white occasionally is tainted with lead; if possible, it should be eliminated entirely, as lead is a cumulative poison, and is not thrown off by the system.

Prof. Trimble read a paper upon "Four Oak Barks from India."

Mr. England called attention to a specimen of our American Carbolic Acid, which was snow white when first obtained, but on exposure in a glass container to the air, it became quite discolored.

A specimen of Japanese Camphor was exhibited, which was of much denser structure than that refined in America, said to be occasioned by the sublimation being conducted at a higher temperature.

"Glassine" labels were exhibited; being celluloid, it was feared that alcoholic and ethereal solutions would be very hurtful to them.

Sublimated peat, an article made in Holland, but sold in Paris. It is peat well cleaned and then treated with a weak solution of mercuric chloride. It is preferable to Oakum, as it is less stimulating.

An imitation Coffee was exhibited; the composition was said to be Rye flour, Chicory, Clay, Molasses, and the seller stated that when mixed in proportion of 25 per cent. with true Coffee it cannot be distinguished. It is quite similar to some exhibited a few years since at one of the pharmaceutical meetings. The industry has recently been revived.

Mr. Thompson, in a paper, called attention to the inferiority of the Oak wood now in the market, and that of some hundred years ago.

On motion, all the papers were referred to the publication committee.

Prof. Trimble exhibited, without recommendation, a poison bottle of such device (representing a human skull) that it was thought it might prevent the contents being misused. The sentiment of the meeting, however, was opposed to the idea of an odd-shaped bottle preventing mistakes.

A sample of Emplastrum Ammoniaci Cum Hydrargyro was exhibited, in which the mercury had amalgamated with the tin of the container, and, of course, rendered the preparation of little value.

This being the last meeting of the series, a new committee was to be appointed, and the Chairman was asked to name, which he did: Wallace Procter, Wm. L. Cliffe, C. B. Lowe, Jos. W. England, Geo. M. Beringer, and Henry Trimble, Chairman.

## PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

### THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The Scientific Section of the American Pharmaceutical Association urgently requests members to inform the Committee as to the subjects upon which they will write, and to send their papers ready for printing to the Chairman not later than June 30th.

The Committee would suggest a number of papers upon the following: Does practical experience with the New Pharmacopœia prove the processes therein contained to be the best?

L. E. SAYRE, *Chairman*, Lawrence, Kan.

CHAS. M. FORD, *Secretary*, Denver, Col.

F. S. HERETH, *Associate Member*, Chicago, Ill.

*Committee.*

### PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.

The Seventeenth Annual Meeting of this Association will be held in the Neversink Mountain Hotel, near Reading, on the 12th, 13th and 14th of June, 1894, the first session commencing on Tuesday, June 12th, at 3 P.M.

The Neversink Mountain Hotel is built on the crest of the Neversink Mountain, at an elevation of 1,200 feet above the sea level, and is a very delightful summer resort. To reach the hotel from the railroad station, electric motor cars run directly from Ninth and Penn Streets to the hotel. The charge for entertainment in the hotel will be \$2.25 per day. Good rooms can be secured by writing early for them to Mr. John B. Raser, Local Secretary, Reading, Pa.

Orders for tickets at excursion rates on the Pennsylvania Railroad and Philadelphia & Reading Railroad can be had upon application to the Secretary.

The Committee on Entertainment has made arrangements for musical and other entertainments for each evening during the meeting, and also for a trip over the mountain railroad.

J. A. MILLER, *Secretary*, Harrisburg, Pa.

### MISSOURI PHARMACEUTICAL ASSOCIATION.

The Annual Meeting of this Association will be held at Excelsior Springs, Mo., June 12th to 16th, 1894. A feature of the meeting will be a number of prizes for papers, exhibits and debates. Further information can be obtained of Dr. J. C. Falk, 1112 Franklin Avenue, St. Louis.

### OHIO PHARMACEUTICAL ASSOCIATION.

The Annual Meeting has been postponed from May 22d to June 5th, and will have headquarters at the Grand Hotel, Cincinnati. A reception, an evening concert and an excursion will be features of the occasion. Albert Wetterstroem, Local Secretary, 435 Colerain Avenue, Cincinnati.



INDIANA PHARMACEUTICAL ASSOCIATION.

The Thirteenth Annual Meeting will be held at Evansville, June 13th and 14th. An interesting programme has been arranged, including addresses by J. U. Lloyd, C. L. Diehl, J. N. Hurty, A. L. Green and C. T. P. Fennel.

PENNSYLVANIA PHARMACY BOARD.

The State Pharmaceutical Examining Board of Pennsylvania held an examination in the Girls' High School at Harrisburg, on Saturday, April 28, 1894.

Two hundred and seventy-two candidates appeared for examination, one hundred and sixty-five applying for registered Pharmacists' Certificates, and one hundred and seven for Qualified Assistants' Certificates. One hundred and nine of the former, and eighty-five of the latter class were successful.

The next examination will be held at Williamsport in July. Applicants for examination should apply to the Secretary of the Board, Charles T. George, Harrisburg, Pa., after the middle of June, for the necessary blank form of application, and the exact time and place of the examination. Applicants should always state, when applying for blanks, for which certificate they wish to be examined.

VIII INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY,  
*Under the High Patronage of His Imperial and Royal Apost. Majesty of  
Austro-Hungary.*

To be held at Budapest, from the 1st to the 9th of September, 1894.

DEPUTY PATRON, HIS IMPERIAL AND ROYAL HIGHNESS ARCHDUKE  
CHARLES LOUIS.

*Secretary-General: Prof. Dr. C. Müller, Rochus Hospital.*

The Organizing Committee of the Eighth International Congress of Hygiene and Demography, to be held at Budapest, from the 1st to the 9th of September, this year, have created a special section for pharmacy, within this Congress' sphere of action.

Our profession will for the first time be represented at the Congress of Hygiene and Demography.

The success of this section can only be secured by the hearty co-operation and moral support of all our colleagues in the pharmaceutical profession. I therefore call upon all our colleagues and upon those belonging to kindred branches of pharmacy, to assist the scientific activity of our section by contributing papers or by delivering lectures.

For the information of all interested, I subjoin here, at the end of this communication, the working programme of the section, observing only that it is not an exhaustive programme, but that the section desires to have these questions discussed at any rate. It is even very desirable that as many as possible may come forward to deliver lectures on so-called free questions, not contained in this programme, which are intended to supplement the questions of the programme. As themes for such lectures, practical as well as scientific questions may serve, which, however, at any rate, ought to be of general interest. Such questions may belong to pharmacy or to branch sciences connected with pharmacy, chemistry, pharmacognosis, botany, pharmaceutical technics, etc.

Notice is to be given of intended lectures not later than the end of April

next to the Secretary-General of the Congress (Budapest, St. Rochus Hospital), or to the President of the Section (IV Zöldfa uicza-Budapest), who signs this communication, and who will be most happy to furnish any information desired.

For the XIXth (Pharmaceutical) Section of the VIIIth International Congress of Hygiene and Demography.

DR. JULIUS JARMAY,  
*President of the Section.*

*Budapest, March 12, 1894.*

#### PROVISIONAL PROGRAMME OF THE SIXTH SECTION.

##### *Pharmacology.*

President, Dr. F. Jármy ; Honorary Presidents, Dr. Arp. Bókai, Dr. Chrl. Kiss, Dr. Alb. Lengyel, Chl. Thán, Dr. L. Tóth, J. Török ; Secretaries, Dr. S. Fischer, Dr. J. Kóssa, Dr. St. Moldoványi, A. Török.

The foreign honorary presidents will be elected by the Executive Committee, as soon as it is known who of the foreign celebrities intend to take part personally in the Congress.

#### QUESTIONS.

##### I.

- (1) International pharmacopœia.
- (2) Qualification of druggists (apothecaries).
- (3) System of control for the free establishment and control of druggist-shops.
- (4) In what manner would it be possible to reduce the prices of medicine so as to make them cheap for the poorer classes, especially for the rural population ?
- (5) Latest notes on the keeping and preserving of drugs.

##### II.

- (1) The dispensation of drugs or medicines by physicians.
- (2) The proper regulation of State control over druggist shops.
- (3) The sanitary evils arising from the selling of medicines of which the composition is kept secret.
- (4) The definition of herbs and the anatomical parts of herbs, as contained in the pharmacopœia.
- (5) The appropriate fitting up of the several parts of apothecary's premises.
- (6) The comparison of the quantitative analytical methods, as contained in the different pharmacopœias.
- (7) The rational denomination of new drugs.
- (8) The drugs of ancient and of present times.
- (9) Incompatible drugs.
- (10) Explosive compositions of medicine.
- (11) International unity for maximal doses.
- (12) Uniformity of the form of prescription.
- (13) The permanganate of soda as the antidote of phosphorus.
- (14) Should the apothecary be examiner of food, drinks and other articles of consumption ?
- (15) Tokaj-wine as a remedy.
- (16) Of the preparations of quinine and of the quantitative determination of pure quinine.
- (17) The newest apparatus necessary for the examination of drugs.
- (18) Introduction and making known of Hungary's medical plants.

(19) The limits of sensibility in the more important reactions as prescribed in various pharmacopœias.

(20) The determination of all the active parts of the more important tinctures and extracts.

(21) Color blindness amongst druggists and apothecaries.

*The Oklahoma Board of Pharmacy.*—The Oklahoma Board of Pharmacy held its regular quarterly meeting for the second quarter of 1894, on April 3d, at Perry, and the following were successful in acquiring the required 75 per cent., and were registered :

Edith Ford, Chandler ; John H. Smith, New Ponca ; A. B. Webber, Pawnee ; Thos. L. Neal, Edmond ; Eugene Watrons, Enid.

Also three others were registered by virtue of being graduates of recognized schools of pharmacy :

Wm. L. Rowland, Langston ; Wm. R. McGeorge, Stillwater ; C. B. Highbargin, Enid.

There were thirty in attendance for examination ; but, as will be noticed by the number who passed satisfactorily, a large percentage of those taking the examination seemed to forget that to register as a pharmacist that there would, in fact, be an examination as to proficiency, and have not been brushing up. It is our purpose to raise the standard of pharmacy in Oklahoma, and as the law is intended, place a safeguard around the people from the uncertain and unintelligent dispensing of medicine.

The next meeting will be held at Enid, on the first Tuesday in July, 1894.

C. P. WICKMILLER, *Secretary*.

KINGFISHER, April 9, 1894.

*The Georgia Board of Pharmacy* met in Americus, May 7th, to examine candidates for druggist, apothecary and pharmacist's license. The percentages required were, respectively, 65, 75 and 85. At this meeting the Board also awarded the prize memberships in the American Pharmaceutical Association. The Board held over and attended the meeting of the Georgia Pharmaceutical Association, which assembled there on the 8th and 9th of May.

DR. HENRY R. SLACK, *Secretary*, Lagrange.

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## OBITUARY.

*Professor Robert Bentley*, of London, died on December 24, 1893. He was born in 1821. He was associated with the Pharmaceutical Society of Great Britain, from the time of its foundation, first as student, and then as Professor of Botany until 1887, when he was elected Emeritus Professor. In 1866 he was elected President of the Pharmaceutical Conference at Nottingham. For many years he acted as chairman on the Garden Committee of the Royal Britannic Society, Regent's Park, and annually gave the fellows a course of lectures on botany. Outside of the Pharmaceutical Society, Professor Bentley occupied the Chair of Botany and Dean of the Medical School at King's College, and the Chair of Botany at the London Institution. His "Manual of Botany" passed through several editions, the last, in 1887, being the most complete.

Professor Bentley was probably best known in this country through Bentley and Trimen's "Medicinal Plants." This work has been, and will continue to be, a standard authority in America. On account of the elaborate colored plates, however, its expense places it beyond individual libraries, but it is none the less sought after and consulted.

*Hugo Wm. Conrad Martin* was born at Fond du Lac, Wis., March 8, 1853.

At the age of seventeen he entered the employ of Huber & Co., of Fond du Lac, remaining with them for three years.

He went to Chicago in 1873, and clerked for L. Schreiber, and afterward with C. M. Weinberger. Mr. Martin graduated from the Chicago College of Pharmacy in 1875, and after graduating joined the College, becoming one of its most active members.

He was married on May 4, 1878, to Miss Lena Amelia Kirchner.

In the summer of 1879, Mr. Martin opened a pharmacy at State and Harrison Streets, where he continued in business until his death.

He served two terms as a Trustee of the Chicago College of Pharmacy, resigning in 1892 to enter the Faculty as Director of the Dispensing Laboratory, a position he occupied until his death.

An earnest advocate of organization, he led the local druggists in their fight against the telephone companies, and later against the "cutters."

He was a member of the Am. Ph. Assoc., and for one year the Secretary of the Ill. Ph. Assoc. An efficient and popular instructor, an aggressive and enterprising pharmacist and a thorough gentleman, Prof. Martin leaves hosts of friends to mourn his untimely decease. He died Sunday, April 29th, after a short illness, of appendicitis. He was buried in Gracelan Cemetery with Masonic rites. He leaves a wife and two children.

BOSTON, April 4, 1894.

At a special meeting of the Boston Druggists' Association, held this day, for the purpose of taking appropriate action upon the death of William J. Cutler, the following resolutions were presented and unanimously adopted by a rising vote :

*Resolved*, That as members of the Boston Druggists' Association, as well as on behalf of the trade which we represent, we desire to place on record our appreciation of the life and character of William J. Cutler, a member of this Association from its organization, and at one time its President.

That we recognize the comprehensive and executive ability which characterized his faithful devotion to the public and private interests of his calling for more than sixty years.

That we gratefully bear witness to his firmness of purpose ; his ready friendliness and helpfulness to others ; his courtesy ; his absolute integrity, and his spotless character.

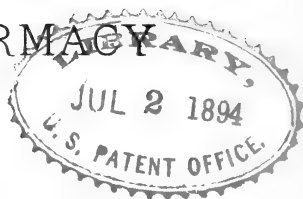
That we tender to Mr. Cutler's family our sincere sympathy in a sorrow which we share with them.

That a copy of these resolutions be furnished to Mr. Cutler's family and to the Press.

The following gentlemen were appointed a committee to attend the funeral of Mr. William J. Cutler: Mr. Thomas Doliber, Mr. Joseph Burnett, Mr. Nathaniel J. Rust and Mr. Gorham D. Gilman.

# THE AMERICAN JOURNAL OF PHARMACY

JULY, 1894.



## A METHOD FOR THE ESTIMATION OF ANTIPYRINE.

BY MILTON F. SCHAAK, PH.G.

Having had occasion to determine the amount of antipyrine in admixture with caffeine, which had been "shaken out" with chloroform from a proprietary headache liquid, it was found desirable to estimate the antipyrine without separating from the caffeine. Accordingly, the following reaction was made the basis of a colorimetric method.

When sodium nitrite is added to an acidified, dilute solution of antipyrine, a blue-green color is produced, which is still perceptible in dilutions of 1 in 20,000. In more concentrated solutions, a crystalline precipitate of the same color is formed.

These results are due to the reaction between the liberated nitrous acid and the antipyrine, by which a compound is formed that has been shown to be nitroso-antipyrine.

It was determined that a standard solution, that will not turn yellow or fade in from 12 to 24 hours, can be made by dissolving .02 gm. antipyrine in 25 cc. of water, adding 1.6 cc. of 1 per cent. sulphuric acid and .8 cc. of 1 per cent. solution of sodium nitrite, and then diluting to 100 cc.

When preparing a solution of an unknown amount, for comparison with the standard, a few preliminary trials must be made to determine the amount of reagents required to fully develop the color, and not be in such excess as to produce a yellowish tinge in the time required.

To avoid precipitation the solution must not be more concentrated than 1 in 500.

When thus properly prepared, the solution can be diluted until the color corresponds exactly with that of the standard.

A little calculation will then show the amount of antipyrine present.

Tubes or beakers of white glass placed upon a white surface are convenient for the color comparisons.

Since the reagents employed do not react with other substances, except pyrazolone compounds, which are not of frequent occurrence, and as antipyrine is readily extracted from mixtures by the use of chloroform, this method admits of wide application.

It may also be mentioned that as this reaction does not take place in the presence of nitrites, but requires free nitrous acid, the incompatibility of antipyrine and (acid) sweet spirit of nitre may be prevented by having the spirit neutral or neutralizing with potassium bicarbonate.

BROOKLYN, N. Y., June 1, 1894.

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## THE SOLUTION AND TINCTURE OF FERRIC CHLORIDE.

BY HARVEY G. BECK, PH.G. —

In the whole history of mankind there is found no other metal upon which depended the progress and civilization of nations as much as that of iron. Its prominence in the arts as well as in medicine gives it a universal popularity.

Therapeutically it has been employed for 3,300 years. To-day it comprises a larger area in the field of medicine than any of the other elements.

Owing to the many preparations of iron, but two will be subjected to investigation, namely: The Tincture of Ferric Chloride which has been used for many years, and the solution of Ferric Chloride which recently became the source of the tincture.

These will be considered together, not with the object of presenting new methods or formulas, but to properly investigate the merits and demerits of the U.S.P. formula, to study the relationship existing between the solution and the tincture, and to determine the value of the various productions as obtained by this method.

Ten carefully selected samples of solution of ferric chloride appear in Table I, showing specific gravity, percentage of ferric chloride, percentage of hydrochloric acid and the presence of nitric

acid or ferrous salt. Twelve samples of the tincture subjected to similar analyses, save that the test for free hydrochloric acid was omitted, gave results as shown in Table II.

TABLE I.—EXAMINATIONS OF SOLUTION OF FERRIC CHLORIDE.

Sample No.	Percentage $\text{Fe}_2\text{Cl}_6$	Percentage free $\text{HCl}$	Specific Gravity.	$\text{HNO}_3$	Ferrous Salt.
1, . . . .	37'46	1'29	1'397	slight	none
2, . . . .	37'57	'85	1'399	slight	"
3, . . . .	36'20	2'03	1'387	decided	"
4, . . . .	37'85	1'04	1'405	slight	"
5, . . . .	38'83	1'41	1'406	much	"
6, . . . .	38'41	'00	1'402	much	"
7, . . . .	35'82	'60	1'367	much	"
8, . . . .	38'71	1'35	1'407	slight	"
9, . . . .	34'82	3'19	1'386	trace	"
10, . . . .	33'83	'84	1'340	none	much
Average, .	36'95	1'26	1'390		

Three of the samples, Nos. 6, 7 and 10, were made by retail pharmacists, all the rest were made by manufacturing chemists, and obtained either directly from the manufacturer, or indirectly from the retailer through the wholesaler.

Six were Baltimore preparations, two New York, one Philadelphia and one Detroit.

All the necessary precautions were taken in ascertaining the specific gravity. Anhydrous ferric chloride was determined by the process given in the Pharmacopœia of 1880, namely: 10 grams of the solution were precipitated with an excess of water of ammonia, well washed, dried and ignited, and weighed as ferric oxide.

Care must be exercised in washing the precipitate, otherwise the percentage of iron will be decidedly too high.

The plan adopted for the determination of free hydrochloric acid, and the tests for nitric acid and ferrous salt, deserve special notice; and the consideration of these will, therefore, be deferred until later.

Observe in the preceding table the approximate relationship existing between the specific gravity and the percentage of anhydrous ferric chloride, also that in most cases it is nearly in proportion to that of the U.S.P. Solution No. 4 is practically correct

in specific gravity and  $\text{Fe}_2\text{Cl}_6$ . No. 10 is lowest in specific gravity, containing also the lowest percentage of  $\text{Fe}_2\text{Cl}_6$ , yet corresponding almost proportionately to No. 4 or the official.

Then again, by taking the average of both columns we have for specific gravity 1.390, and for  $\text{Fe}_2\text{Cl}_6$ , 36.95 per cent., and again the proportion corresponds practically to that of the official—37.8 per cent.

The average of  $\text{Fe}_2\text{Cl}_6$  is .85 per cent. below that of the official, which would imply a good collection of samples; but when the extreme variation is observed to be 5 per cent., this would at once indicate some weakness and imperfection in the process, which is to be attributed to the later part in which the U.S.P. directs after effervescence, etc., add enough water to make a certain definite weight. If pure iron wire is used, hydrochloric acid containing 31.9 per cent. of absolute acid, sufficient time allowed for complete reaction, the tests for nitric acid, ferrous salt and oxychloride cautiously applied, and the work carefully manipulated, it will result in a reliable product. But the iron is not always pure, hydrochloric acid is often of indefinite strength, the reaction not always completed, besides taking into consideration the liability to error in applying the tests, and the manner in which the work is generally conducted; hence, the process will not result in products of uniform strength. If, instead of diluting the solution to a definite weight, it be diluted to a definite specific gravity, we then might disregard slight impurities in iron or  $\text{HCl}$ , or other sources of errors likely to be encountered, and secure decidedly better results.

Another noteworthy fact in connection with the table is this: Had the solutions with a specific gravity below that of 1.405 been evaporated, and those containing a higher specific gravity further diluted so that they would all conform with the official in specific gravity, the percentage of  $\text{Fe}_2\text{Cl}_6$  would vary only about 3 per cent.

The fact above-mentioned, with others involved in the table, forcibly impress some excellent advantages over that of the official method.

The Pharmacopœia directs free hydrochloric acid to be present in the solution of ferric chloride, but does not furnish a method whereby the amount contained may be determined. The U. S. P. assay for anhydrous ferric chloride is not in itself sufficient to insure the quality or standard of the preparation. Every pharmacist should be fami-



liar with the fact that the medicinal qualities largely depend upon the quantity of hydrochloric acid present. When deficient it reduces the percentage of iron and deprives the tincture made therefrom of the ethereal odor, and when added in excess it is very deleterious insomuch that it affects its therapeutic properties, becoming injuriously irritating to the stomach and often producing secondary effects which are very undesirable. References have been made to various works and text-books on chemistry with a view of finding some satisfactory method for making this determination, but with unsatisfactory results; in consequence of which a new and original method (suggested by Prof. W. Simon) was employed, proving to be very applicable, simple and accurate, giving perfect satisfaction in all its details.

Take 1.0 gram of the solution, dilute with 100 cc. of water, neutralize with seminormal solution of potassium hydroxide, using litmus as an indicator, transfer it into a flask and add enough water to make 250 cc. Titrate 50 cc. of the supernatant liquid with decinormal solution of silver nitrate, after the addition of a few drops of neutral potassium chromate. From the number of cc. of silver nitrate solution required, determine total amount of hydrochloric acid present. From the percentage of  $\text{Fe}_2\text{Cl}_6$  already ascertained in the sample, calculate the amount of absolute acid represented, and deduct from the total; the result will be the free acid present.

In case an excess of KOH solution is added titrate back with sulphuric acid solution.

The official solutions should contain 27.43 per cent. of hydrochloric acid, allowing 1.95 per cent. for free acid. It will be readily observed that the solutions are generally deficient in hydrochloric acid. This is due to a weaker acid than the official being used in making the preparation, causing considerable oxychloride to be formed during the process, which is not always detected. The 5 per cent. of official acid, directed to be added, is partly taken up by the oxychloride, thereby reducing the amount of free acid. The excess is accounted for by reason of insufficient time allowed for the acid to act on the iron. Nos. 3 and 9 are examples of the latter.

The percentage as stated in the column is absolute acid.

Prior to the publication of the Pharmacopœia of 1870, tincture ferric chloride was made either directly from iron wire or from the subcarbonate of iron. The pharmacopœial directions of 1850 were:

"Pour the acid upon the subcarbonate of iron in a glass or porcelain vessel, mix them, and when effervescence ceases, apply a gentle heat and continue it, stirring occasionally until the carbonate is dissolved, then filter the solution and mix with the alcohol." This formula did not provide for an excess of acid, consequently precipitation was apt to ensue; particularly did this objection prevail when inferior acid was used. Tinctures made by this process are very unreliable and of indefinite strength. Incessant complaint of the imperfection of the formula resulted in the adoption of a new and much improved method in the Pharmacopœia of 1860, as proposed by Dr. Squibb and published in the American Journal of Pharmacy, 1857, p. 290.

Pure iron wire was substituted for the subcarbonate. The official directions were: "When effervescence has ceased drop in nitric acid, constantly stirring until it no longer produces effervescence. Lastly, when the liquid is cold add sufficient distilled water to make it measure a pint and mix it with alcohol."

This yielded a tincture which contained a little nitric acid, and all the nitrous acid the iron solution was capable of holding at a temperature near the boiling point. It is claimed that such a tincture has, in six months or a year, a full ethereal odor in which ethyl nitrite is recognizable.

The 1870 Pharmacopœia again modified this formula; the two steps in the process were separated and two distinct preparations introduced, one an acid solution of ferric chloride, the other the tincture which was made from the solution.

The committees on revision of 1880 and 1890 continued this plan. Our present official directions are: "After effervescence has ceased apply heat by means of a sand bath, until the liquid is free from nitrous odor."

This solution yields, after being mixed with a definite quantity of alcohol and allowed to stand for three months, the official tincture of ferric chloride. This tincture does not possess the same degree of ethereal odor as that of the 1860 tincture. Even after standing six months or a year, it does not possess much more than a trace. The reaction between the acid and the alcohol is very slow, and the portion of acid small that enters into combination with the alcohol in forming ethers in the course of three months. Therefore, the U. S. P. directs it to stand three months, although it is preferable to stand a year. The ethers formed possess diuretic properties. Com-

paratively few pharmacists comply with that part of the process where it is directed to stand three months; accordingly such products are deficient in diuretic properties.

When the samples were collected one store was found to be out of the tincture entirely. The proprietor immediately proceeded to supply my wants with an extemporaneous preparation. The public at large might take pride in securing a freshly prepared article, but it surely is not what should be expected by those knowing its properties.

The following table gives the results of a comparative analysis of the tincture as found in the retail store :

TABLE II.—EXAMINATIONS OF TINCTURE OF FERRIC CHLORIDE.

Sample No.	Specific Gravity.	Fe <sub>2</sub> Cl <sub>6</sub> Per Cent.	Parts by Weight of the Solution used in making the Tincture.	Made from Solution Number	HNO <sub>3</sub>	Ferrous Salt.
1, . . . .	·980	13·15	35	1	o	slight
2, . . . .	·987	10·00	26·6	2	o	slight
3, . . . .	·972	11·52	—	—	o	o
4, . . . .	·980	13·80	—	—	o	trace
5, . . . .	·980	13·33	—	—	trace	o
6, . . . .	1·028	17·09	45	4	slight	o
7, . . . .	·927	10·25	28·6	7	o	decided
8, . . . .	·948	11·50	—	—	slight	o
9, . . . .	1·032	11·31	—	—	o	much
10, . . . .	1·031	12·68	33·6	6	o	much
11, . . . .	1·030	10·71	29	3	trace	o
12, . . . .	·972	13·03	—	—	much	o
Average, .	·989	12·36	—	—	—	—

All the samples were collected before the introduction of the new Pharmacopœia, and should, therefore, contain 13·25 per cent. of anhydrous ferric chloride and have a specific gravity of ·980. The new Pharmacopœia has modified the formula for making the tincture somewhat, altering the specific gravity and percentage of anhydrous ferric chloride.

No relationship exists in above table between specific gravity and

percentage of ferric chloride, as in Table I. Compare the average of the two columns and observe that the specific gravity is above that required by the U. S. P., whilst the percentage of ferric chloride is below. Solutions Nos. 9, 10 and 11 having the highest specific gravity are almost inversely proportioned in value of ferric chloride. Such dissimilarities may be due to various causes. The specific gravity is dependent upon the amount of ferric chloride present, the quality of the alcohol, and it is regretting to mention that some of the samples are largely influenced by the presence of water.

By a simple calculation the parts by weight of the solution used in making the respective tincture by the retail pharmacist can be ascertained from the results obtained by the analyses.

A tincture made with a deficient amount of solution, yet retaining its specific gravity, or as in many instances is materially increased, is evidence of the fact that water has been added.

It may, therefore, be assumed that all tinctures having a specific gravity above that of .980 and a percentage of ferric chloride below that of 13.25, contain a certain amount of water in substitution for alcohol. Nos. 2, 9, 10 and 11 are examples of this class.

Many writers claim it is impossible for tinctures to be devoid of ferrous salt; however, as stated in the table, reactions were obtained from six only.

Some of the tinctures were not made long before the samples were collected. From this time they had been kept in the dark until the tests were applied.

The gradual decomposition taking place is accelerated by heat and light with the reduction of ferric salt into ferrous. Possibly if the tinctures were allowed to stand a considerable length of time, and exposed to heat and light, they would afford a reaction for ferrous salt. Invariably nitric acid was found to be present in the solutions, sometimes ferrous chloride, and very seldom could they be secured free from both these impurities. The presence of nitric acid may be regarded as the result of pure carelessness.

LABORATORY OF THE MARYLAND COLLEGE OF PHARMACY,

June, 1894.

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The Scotch Broom is a useful flowering shrub early in June. When planted on high well drained land it is perfectly hardy near Philadelphia, although further north it suffers unless carefully protected in winter.

NOTE ON WILBUR S. SCOVILLE'S PAPER "CHANGE OF  
VOLUME WHEN LIQUIDS OF DIFFERENT  
DENSITIES ARE MIXED."

BY LOUIS KAHLENBERG.

My attention has recently been called to the above-mentioned paper, which appeared in the minutes of the meeting of the American Pharmaceutical Association (p. 131), held at Chicago, August 14 to 20, 1893. In his article, the author gives a list of thirty-four experiments illustrating that changes of volume generally occur when liquids of different densities are mixed. He mentions the fact that slight changes in temperature also take place, but states that the object of his paper is "only to call attention to the changes in volume which occur, to show how nearly universal this change is, and to demonstrate that it is of sufficient extent to render void the use of specific gravity rules,\* in most cases, for anything except approximate results."

If Mr. Scoville will take the pains to consult the chapter on solutions in Ostwald's *Lehrbuch der Allgemeinen Chemie* (2te Aufl.) Band I, p. 636, he will find that the fact that he seeks to point out by his few isolated experiments has long been known, and that there are generally not only changes in volume when two liquids of different densities are mixed, but also changes in the optical, thermal and other properties. Professor Ostwald treats the especially interesting case of salt solutions in a separate chapter of the volume already mentioned (see pages 782 to 791). References to numerous memoirs on this subject will also be found in the localities cited.

CHEMICAL LABORATORY, UNIVERSITY OF WISCONSIN,

June 4, 1894.

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The extermination of our native flora by forest fires is often more complete than that caused by plant collectors, who miss small seedlings and do not remove all the roots of plants. But a fire, especially when it attacks the habitat of plants such as *Cypripediums*, imbedded in sphagnum moss and covered with old leaves, completely destroys them, root and branch.

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\* Meaning the ordinary rule that applies closely only in those few cases where the volume of the mixture is exactly equal to the sum of the volumes of the liquids mixed.

## WHAT ARE THE PURPOSES OF THE NATIONAL FORMULARY, AND HOW CAN IT BEST BE MADE TO SERVE THESE PURPOSES?

BY JOHN F. PATTON.

Read before the Pennsylvania Pharmaceutical Association, June 15, 1894.

The National Formulary is the natural development and legitimate outcome of the present evolution of the application of remedies to disease. In other words, it standardizes and gives uniformity under authority to an important list of unofficial medicinal preparations generally prescribed throughout the country. It is said, all inventions take their rise from wants unsupplied; hence the proverb, "necessity is the mother of invention."

The want of a uniform standard for unofficial preparations was everywhere felt, and especially was this the case in our larger cities, as witness the fact that its birthplace was in the centre of densest population. Reforms are only inaugurated when evils become unbearable. A multiplicity of new remedies, with no definite standard for their manufacture, was the evil which the National Formulary was designed to correct.

The recently revised and greatly enlarged edition of the United States Pharmacopœia, with its definite standard of remedies, forms but a limited portion of the resources of the medical profession in the treatment of the sick, and this limit, unfortunately, has been greatly enhanced by a disposition, on the part of physicians, to experiment with every new preparation brought to their notice.

The loaded condition of the shelves of the average pharmacy, with compounds outlandish in name, secret in composition, and extravagant in price, many of which were but different brands of what was intended to be one and the same thing, became such a burden as to demand relief.

The initiative to that end was taken by a committee representing the New York College of Pharmacy, the German Apothecaries' Union of New York City, and the King's County Pharmaceutical Association, of Brooklyn.

These committees collecting local and private formulas, published them in book form. Their ready acceptance and general use proved the correctness of the belief as to the lines along which the desired relief was to come.

"As this book," in the language of the preface to the National Formulary, "appeared at a time which happened to be particularly favorable for the realization of the object to be attained," it gained so much ground, even outside of the locality for which it was originally intended, that the joint committee, authorized by the societies which it represented, tendered the work to the American Pharmaceutical Association as a nucleus for the construction of a National Formulary. This was done at the annual meeting held in Pittsburg, in 1885.

The American Pharmaceutical Association having accepted the gift, a committee was appointed to prepare such a work, and as a first result this committee presented at the next annual meeting, held at Providence, R. I., in 1886, a preliminary draft for a National Formulary.

It comprised whatever the committee had been able to gather, either from existing formularies, from its own labors, or from the special contributions of individuals or societies.

This draft showed more forcibly than could have been done in any other manner, how serious the existing evil was, and at the same time how difficult would be the task to bring into harmony the conflicting views and customs.

For the purpose of enabling the committee to accomplish this task with better expectation of success, it was enlarged by the addition of one member from every State Pharmaceutical Association in the United States and Canada.

The committee thus constituted, two of the thirty-five members coming from the Dominion, represented the best element in the domain of Pharmacy. Two years later, in 1888, the work was given to the public.

So much for a brief historical sketch of the National Formulary.

Some reflections may now be indulged in, as to the causes making it necessary, and the means to be employed for its more general use by both physician and pharmacist.

My experience and observation in a limited way leads me to the conclusion that the average physician is unfamiliar with this work, and, to a certain extent also, that of the United States Pharmacopœia. This may account in a measure for his readiness to prescribe any new remedy offered, and his ready acceptance of the extravagant statements made in their praise we must attribute to human

credulity. Alas! the pharmacist has proven himself only too willing to act as distributing agent and middleman in dispensing medicinal compounds of someone else's manufacture. Is this owing to a lack of enterprise, or a lack of ability, or both?

Induced by the large profits to be secured, the unbounded activity on the part of the manufacturers, who aspire to instruct and aid physicians in their practice, is only equalled by the lavish praise and recommendation of formulas (someone's favorite prescription), to say nothing of the teeming pages of nostrum advertisements constantly found in the medical journals. The American Medical Society, at their last meeting, characterized in the severest terms the prostitution of the pages of their official journal to such base ends.

A physician's practice must be intricate and complicated to a degree, if he cannot find in the U. S. Pharmacopœia and National Formulary remedies to meet all his demands. The physician and pharmacist are working together in a worthy cause and must of a necessity be mutually helpful. If we fail to inspire our co-laborers with confidence in our ability as pharmacists, it is because we have not measured up to our opportunities. The latest editions of all the text-books in the druggist's library, together with some of the excellent pharmaceutical journals now published at so small a cost, not only furnish us with the weapons of proficiency, but create an impression on the mind of the physician only equalled by that of a well-appointed laboratory. Besides, if the physician accepts the aid of the manufacturer in his practice, he would not refuse the efforts of the local pharmacist in that direction, were they offered. Let us prove ourselves such competent pharmacists that there will be no question in the mind of any of our physicians as to our ability to prepare any remedy to meet any special case. We can best make our doctor patron acquainted with the merits of the National Formulary by placing in his hands a copy of the work, and would it not be a good stroke of business to do so? We may expect, in the near future, an issue of a revised and enlarged edition.

The present condition of the druggist is in many cases a struggle for existence, and the outlook for the future points to a survival of the fittest.

His only hope is in producing, manufacturing, everything in his line which affords a margin of profit—not only the pharmaceuti-



cals and simpler chemicals, but all of those household remedies for which there is always a demand. Let his laboratory command more of his time, thought and attention than his soda fountain.

Let us take counsel of the methods of the manufacturer. Let us adopt his plan, and present to our physicians samples of National Formulary products. This is one of the ways, at least, in which it can be made to serve the purpose of its publication.

Will you try it?

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## THE "CUTTER" AND THE REMEDY.

BY J. H. REDSECKER, LEBANON, PA.

Read before the Pennsylvania Pharmaceutical Association, June 14, 1894.

The druggist, dealing as he does in medicines and medical appliances, seems to be the natural channel for the distribution of proprietary remedies. The retail prices of these goods are fixed by the manufacturer, and the public have willingly paid the established prices without murmur or complaint. When we remember that many of them are slow sellers, that they must be kept and are often dead stock on the dealer's hands, the margin of profit they have afforded was none too much. Within recent years, however, the cutting of the prices of these preparations has been inaugurated, and that it has been an injury to the trade is beyond question, as druggists have been compelled to handle this class of goods without any margin of profit whatever.

That there must be legitimate profit in all business will be readily admitted, for without it the business man could not live, pay his clerks, his taxes and the obligations he owes to his family. When some of our inventors succeed in discovering a way by which we may dispense with the "butcher, the baker and the candlestick maker," not to say other necessary craftsmen, may we hope to do business without profit and sustain life.

Various plans have, from time to time, been proposed to prevent cutting in prices of these so-called patent or proprietary medicines, but thus far without producing the desired results. To suggest a remedy now seems almost a hopeless task. The old adage, "that fools rush in where angels fear to tread," may find a parallel in the task I have undertaken in proposing a remedy for this evil of cutting.

We are assured by our friends, the wholesale dealers, that even with a margin of ten per cent. profit which the rebate system gives them on this class of goods, they are handling them at a loss; and we do not doubt their statements. If this be so when the sales run up into the tens of thousands of dollars and where a margin of ten per cent. yields quite a large return, how much greater is the loss of the retailer whose sales are but small and who is compelled, through this cutting of prices, to sell them at actual cost? You may ask why does he handle them? Simply because he is compelled to do so. People come to his store for them, and when there possibly purchase something else. If he does not keep them, they will not come to his place at all and the trade he may have in other lines of legitimate pharmacy will be lost to him. Hence, he keeps them, not from choice, but from necessity.

That the many plans proposed to overcome this evil have not been successful, is due to several causes, not the least of which is the indifference of some of the manufacturers, if not their quiet encouragement of the "cutters;" for no matter at what price the goods are retailed, they get their full prices for them. Then, too, we have some of the jobbing trade who are only too glad, despite all efforts to the contrary, to supply the "cutter" in the hope of securing his general trade and thereby making some profit out of him.

That many of these preparations are worthless, not to say harmful, is unquestioned, and that by skilfully worded advertising they lead to many imaginary diseases and injurious dosing of the system, is an indisputable fact. There is no doubt the general health of the public would be improved were there a disuse of these patent nostrums, many of which are compounded by persons who have no medical or pharmaceutical knowledge, and a return to the old practice of consulting an intelligent physician and following his advice.

Instead of making our stores the repositories for the thousand and one nostrums of which we know absolutely nothing, the abolition of them would relieve us of much unemployed capital and bring back pharmacy to its legitimate channel and be a positive benefit to the pharmacist, the physician and the public.

It is my purpose to present two propositions for the cure of this cut-rate evil, and whether you agree with me or not, if I but set you to thinking, and eventually to acting, I shall have accomplished

something and the preparation of this paper will not have been in vain.

First: We should endeavor, by national legislation, to so amend our trade-mark law as to give no proprietorship in medicines or medical preparations. I believe this is the case in France. When this is done we will not have anyone adopt fanciful names for old and well-recognized preparations, and endeavor to prevent their manufacture by others. Nor will we have two or three well-known chemicals combined, and foisted on the public at a price twenty times their actual cost. A patent covers a period of fourteen years, but a trade-mark, like Tennyson's brook, goes on forever.

My second proposition is, to secure, by State legislation, the enactment of a law making it an offense, punishable with fine and imprisonment, or either or both, for any person to sell, or offer for sale, any so-called patent or proprietary remedy, the sworn formula of which is not registered with the Secretary of the State Pharmaceutical Examining Board, which shall be open to inspection, unless such preparations, under certain restrictions, are prepared by a citizen registered under the State Pharmacy Law. When we have legislation such as is here indicated, may we hope to place pharmacy where it properly belongs, and we shall have the dawning of a new era for the pharmacist and a benefit to the public which they will learn to appreciate more and more as the years roll around.

The following is the text of a State law, such as I have outlined:

#### AN ACT

To prevent the sale of so-called patent or proprietary medicines within the State of Pennsylvania, unless the formula of the same is registered with the Secretary of the State Pharmaceutical Examining Board.

SECTION I. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in general assembly met, and it is hereby enacted by the same,* That it shall not be lawful for any person or persons whatsoever, to sell or offer for sale within this Commonwealth any secret nostrums, proprietary or so-called patent medicines, unless the formula of such preparation or preparations, duly attested under oath, be first registered with the Secretary of the State Pharmaceutical Examining Board, who shall receive a fee of twenty-five dollars for each registration, one-fifth of

which shall be for the use of the said Secretary, as compensation, and four-fifths for the use of the said State Pharmaceutical Examining Board; *Provided*, That nothing in this Act shall prevent any pharmacist, who is a resident of the State, and registered under an Act, entitled "An Act to Regulate the Practice of Pharmacy and Sale of Poisons, and to Prevent Adulterations in Drugs and Medicinal Preparations in the State of Pennsylvania," approved May 24, 1887, and its several amendments, from preparing and selling any remedy or remedies, the sales of any one of which do not exceed five hundred dollars per year.

SEC. 2. Nothing in this Act shall prevent any person or persons from manufacturing or selling any proprietary or so-called patent medicine when the same is shipped outside of this Commonwealth.

SEC. 3. Any violation of any of the provisions of this Act shall be a misdemeanor punishable by a fine not exceeding five hundred dollars, or imprisonment not exceeding one year, or either or both, at the discretion of the Court. And it shall be the duty of any public prosecutor in any county of this Commonwealth to see to the enforcement of this Act.

SEC. 4. This Act shall go into effect on the first day of January next succeeding its passage.

SEC. 5. Any Acts or parts of Acts inconsistent herewith are hereby repealed.

## CAN WE MODIFY THE ACRIDITY OF GUAIAIC?

BY WM. B. THOMPSON.

Read before the Pennsylvania Pharmaceutical Association, June 14, 1894.

For a violation of the laws of our physical being we pay a two-fold penalty. We suffer an indisposition, an ailment or a malady, as the case may be. This is, of itself, hard enough to bear, and demands fortitude and submission, but when the sufferer is told that superadded to his weight of misery will be the administration of certain periodical doses of a distasteful stuff called medicine, the cup is, indeed, full, and the punishment seems adequate to secure a thorough repentance.

Numerous and very ingenious, indeed, have been the expedients by means of which it has been sought to disguise, to conceal and to obtund the bitter, the acrid and the nauseous, and the art of the

apothecary has been prayerfully invoked to make at least one of the tribulations of illness more easy of endurance. The honesty of duty, too, has been sorely tried, at times, under this appeal, and the bitter sometimes omitted from the cup to that extent that it has no existence there save in name. But as it has been declared impossible to construct a silken purse out of the substance of a sow's ear, so likewise the natural fetid odor and rank taste of a repulsive drug to become a palatable thing must be so transformed in its character and identity as to detract seriously from its usefulness. But, nevertheless, the fiat has come from the chamber of sickness, and the ministers must strive to obey. The physician looks to his henchman, the apothecary, to prepare his draughts, and that patient investigator of methods, known and unknown, seeks in his granule and parvule, with its environment of tinted sugar, a solution of the problem. Art has made wondrous strides in all the numerous laterals of pharmacy; skill in mode of preparation, in form of presentation, robs many an otherwise detested thing of its natural repugnance. Many a boon to the pangs of suffering mortals is to be found in the present domain of elegant and advanced pharmacy. But our query has to consider a substance so positively intractable in its physical composition as almost to defy ordinary methods to overcome it. Fortunately, in medicine, it is not a "sine qua non," and, perhaps, it rather belongs to a previous period when medication consisted wholly in crude substances in form as nature supplied them. So that it may be said that an enforced recourse to other and more acceptable substitutes has relegated guaiacum largely to a rear rank of remedies.

There is no function of the physical organization, especially of man, of such extreme delicacy and sensitiveness as are those of the organs which convey the sense of taste. Those numerous papilla, chiefly of the tongue, guard like so many alert sentinels the approach to that important repository, the stomach, and give instant warning when any foreign invader approaches. Remonstrance, in which case, instead of bristling bayonets, is shown in shrugged shoulders and wry faces, final submission being always accompanied with a protest. The guaiac resin, for it is a misnomer to call it a gum, consists mainly of resin, combined with an acid analogous to or identical with that of benzoin. This knowledge of its composition reveals its character, that of an acrid substance

developing after contact in the fauces, a burning persistent taste with a sensation in the affected parts of a surface roughened, or even excoriated. In just how far the physiological effects of medicines must be tolerated in order to secure their fullest utility, is a question we are hardly prepared to discuss here. Sheathing the mucous secreting surface with a demulcent adjuvant, seems to present as the first suggestion, for it is necessary that for topical or localized application we should have the resin in as impalpable a powder as is attainable.

If time was not a limited quantity, I should like to diverge here for more than a moment or two, to speak of the importance to the manipulator of drugs of studying each particular substance or product as it comes into his hands, in order to acquire the fullest knowledge, not only of its properties, therapeutically, but of its characteristics physical, and other composition. It is this knowledge which gives us the power over the material to use it and combine it. Who but the potter can mould and shape the otherwise senseless clay? In dealing with our guaiacum the first thought which suggests is to interpose some sheathing substance or to so envelop this acrid property, that its release shall be by unappreciable degrees and thus obtunded. The illustration of this suggestion is here presented in the form of a compressed troche or lozenge, each containing two grains of the gum of guaiacum. Petroleum and chocolate are here the carriers of the medication, and the solution is effected in the fauces in such a manner that although the peculiar pungency is perceptible, the contact is not disagreeable. Doubtless in more skilled hands than mine, the principles here employed could be made to yield yet more satisfactory results, and a pursuit of the subject may prove attractive to others.

Our query has, of course, more to do with the topical or localized effect than with that of its general therapeutic action on the internal economy. Still, it will be interesting to note, at this point, the efforts which have been made to obviate the objections which have ever existed to the uses of this substance. The range of preparations into which guaiacum enters as a chief component is not great. A partial saponification was early resorted to to secure greater solubility, as well as a modified action. This is instanced in the "Soap of Guaiacum." Acting upon this, Dr. Benjamin Dewees, an honored member of a former regime of eminent medical practitioners,

formulated that alkaline tincture of guaiacum which to this day bears his name and authorship.

Then the framers of the Pharmacopœias adopted into our national codex, first, the simple alcoholic solution, a tincture, and then the ammoniated alcoholic tincture, and these two latter have continued in official sanction to this day. A reference to numerous prescription files would doubtless show but limited uses of these preparations, and we may again turn to the immediate object of our query.

In my remarks upon this subject I have raised the question as to how far the property characteristics, which are peculiar to many drugs; and these most pronounced and definite in odor and taste, can be changed or modified in their action upon our sensible organs without jeopardizing in a positive degree the very properties which decide their value.

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## TABLET TRITURATES.

BY D. J. THOMAS.

Read before the Pennsylvania Pharmaceutical Association, June 14, 1894.

The past decade marks a new era in pharmaceutical history. Never since its inception has pharmacy made such rapid, progressive strides as within the last ten years. It has kept pace with the developments in other lines of art and science, and the discoveries of the inventive pharmaceutical mind will pass into history that shall occupy a conspicuous place in the archives of pharmaceutical literature.

The demand for elegant pharmaceutical preparations has resulted in the introduction of a class of products known as Tablet Triturates, or, more properly, Triturate Tablets. Whether it may consistently be maintained that they are entitled to a place in the list of "elegant pharmaceuticals," a difference of opinion exists; many claiming that they cannot lay claim to a position in that class. Something should be known by the pharmacist as to the position Triturate Tablets occupy, the extent of their use, what prompted their introduction, and the position they have finally attained. This has given rise to the queries: "To what extent are physicians employing Triturate Tablets in their practice, and with what degree of success? Has the introduction of these diminished the prescription

business with the average pharmacist?" (1) What are Triturate Tablets? The writer finds they are simply mixtures or triturations of an active, combined with an inert or inactive substance—such as sugar of milk with an adhesive powder moistened, made into a mass of proper consistency, and forced into suitable moulds, usually by means of a spatula, and formed thereby into discs or tablets. The finished product affords a convenient means of administering drugs usually given in pill, powder or liquid form without resorting to the necessity of measuring or weighing, and apparently possessing an advantage over pills, inasmuch as their solubility or ready disintegration by the stomach is not impeded by an outward coating, as in the case of coated pills or capsules. To the country practitioner, with cumbersome saddle-bags and medicine cases, they are a boon and great convenience, overcoming the necessity of weighing, measuring or subdividing. He now has a line of preparations of known strength, inexpensive and portable, and at the same time yielding results that are determined by their intelligent use.

The history connected with their introduction is rather meagre. They were first described by Dr. Robert M. Fuller, of New York City, in an article published in the *New York Medical Record*, of March, 1878. The slowness of action of coated pills culminated in the suggestion for the manufacture of tablets, the writer of the article claiming many points of advantage over the coated pill. In point of solubility, Triturate Tablets are a success. Owing to their porous, spongy character, the fluids of the stomach act upon them promptly, resulting in a rapid disintegration, and consequently a quicker action might reasonably be expected therefrom.

Thus far, the country practitioner is the largest consumer or distributor of Triturate Tablets. This fact is sustained by evidence and data gathered from prominent manufacturers of these products. There seems to be a growing disposition, however, on the part of physicians in the more densely populated towns and cities to employ Triturate Tablets in their practice, as well as the physician who, by reason of his removal from close proximity to the pharmacy. However prejudicial the pharmacist may be towards the introduction of a line of products that might in anywise alienate the prescription business from his hands, he is forced to admit that the Triturate Tablet has already attained a formidable attitude. It is well to estimate the probable position Titurate Tablets might



occupy ultimately; and if their use is to be encouraged, what will eventually be the effect upon the prescription business? As previously stated, the Triturate Tablets are most largely employed by the country practitioner, and as his course does not materially affect the prescription business of the pharmacist, the movements of the city physician do most vitally concern him. In many instances it was found that the city physician purchased liberally of the tablets, and supplied them gratuitously to his patients, thus necessitating an outlay of money for which he received no return. There seems to exist a difference of opinion among physicians as to the wisdom of this course. Although it brings the physician in closer touch with the patient, rendering the latter dependent upon the former for his supplies of medicine, it involves the gratuitous disposition of the physician's stock. In some instances the plan has been discontinued. It is maintained by many pharmacists that the popularity of tablets is due to a fad, and like many other things that promise for a time to become staple, they will have their day and eventually fall into disuse. However true this prediction may be, time will prove its accuracy. By those who endorse and advocate their use, it is claimed that their popularity is only in its infancy, that they have not yet even attained to the medium of their ultimate universal adoption.

Although Triturate Tablets possess, in many instances, an obvious superiority over pills, they are, however, objectionable in others. For example, in exhibiting the bitter substances, such as Strychnine, Quinine, Aloes, etc. Owing to the absence of a coating, it is quite impossible to swallow a tablet containing any of the bitter medicaments without leaving some indication of its bitterness upon the sense of taste. An occasional objection is found in some instances where the active constituent of the tablet is crystalline in character; owing to the recrystallization in the tablet, it becomes hard, and consequently rendering it difficult to reduce to a powder unless subjected to extraordinary pressure, thus destroying, to some extent, one of the advantages claimed for it. Again, if the quantity of adhesive matter introduced into the tablet for the purpose of maintaining its form and holding it together has been used in excess, its ready reduction to powder is impeded. Care, therefore, should be intelligently exercised in their preparation, or, again, their superiority over coated pills becomes weakened. From personal observation, it must be

admitted that in proportion to the increased demand for Triturate Tablets there appears to be a decreased demand for pills, capsules, and powders. While there still remains an active demand for pills, powders are being rapidly supplanted by tablets. It is not claimed by the writer that this condition exists wherever tablets have been introduced. The reverse of this condition may exist in many sections.

It is a settled fact that Triturate Tablets have come to stay, at least until some better means has been discovered that will accomplish the same end. As there is no secrecy about the "modus operandi" for the manufacture of Triturate Tablets, they can be produced by the average pharmacist through the employment of ordinary skill and the utensils he now has at hand, *i. e.*, with mortar and pestle, glass or porcelain slab, spatula, and a few sets of hard rubber or metallic moulds, he finds himself equipped for the production, on a small scale, of any tablet that the large manufacturer is capable of making, with the exception, as in all other things, that they can be made on a larger scale at a greatly reduced cost. The possible danger of ultimate injury to the prescription business can only result where the pharmacist fails to recognize the preference the physician is disposed to show towards the Triturate Tablets, and refuses to supply them when prescribed.

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## ON THE DETECTION OF EXHAUSTED GINGER.<sup>1</sup>

BY A. H. ALLEN AND C. G. MOOR.

Since the publication of the paper of Dr. Dyer and Mr. Gilbard in *The Analyst* for August, 1893, purchases of ground ginger under the Sale of Food and Drugs Act have been made in various parts of the country. In order to report on such samples to the best advantage, we have made a series of experiments on various specimens of ginger, and have collected data of considerable interest.

Taking advantage of the experience of Dyer and Gilbard, we have in each case determined the proportion of soluble ash, by which we mean the percentage on the original ginger which is dissolved out on treating the total ash with boiling water. In practice, perfectly good results are obtainable by regarding as the "soluble

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<sup>1</sup> *The Analyst*, 19, 124.

ash" the difference between the weight of the total ash and the ash insoluble in water. The aqueous solution can, of course, be used for determining the alkalinity, or the actual potash present.

Dyer and Gilbard found the proportion of soluble ash from genuine ginger to vary from 1.9 to 3 per cent., with an average of 2.7, while Mr. W. C. Young found in seven authenticated samples of ginger a range of 1.8 to 2.6 for the soluble ash. Figures for five samples of genuine ginger of unknown origin have been communicated to us by Mr. T. H. Pearmain, and show soluble ash ranging from 1.8 to 2.7 per cent., calculated on the moisture-free samples. The following are Mr. Pearmain's figures:

	1.	2.	3.	4.	5.
Total ash, less sand, . . . . .	3.1	3.9	3.7	5.0	4.5
Ash soluble in hot water, . . . . .	2.2	2.7	2.4	1.8	2.0
Fixed ether extract, . . . . .	3.2	3.0	2.5	5.0	4.2
Alcoholic extract after treatment with ether, . . . . .	2.7	3.1	3.4	2.9	3.0

These results bear out in the main those of Dyer and Gilbard.

Contrary to the general impression, for the manufacture of essence of ginger an aqueous or very dilute alcoholic liquid is employed. The use of any but very dilute spirit, 75° U. P., causes the solution of a considerable quantity of resinous matter, which is precipitated when the essence is subsequently diluted with the water of the ginger-beer. Hence, the use of alcohol in anything more than the most moderate proportion is neither necessary nor desirable, and the more so as the greater part of the pungent and flavoring principle of ginger is readily extracted by cold water. Exhausted ginger having already been subjected to treatment with water or a slightly alcoholic solvent, the soluble portions have been to a great extent removed, and hence such ginger yields a lower extract than a genuine article. The aqueous extract contains a considerable quantity of soluble salts of organic acids, and the ash is correspondingly deficient in soluble salts, and especially in compounds of potassium. In consequence of the presence in ginger of calcium salts soluble in dilute alcohol, the ash left on igniting the proof-spirit extract often considerably exceeds the proportion of soluble ash. This curious fact is no doubt due to the conversion of these calcium compounds into carbonate by ignition, thus rendering them insoluble in water.

In the hope of finding a solvent which would dissolve the valuable portion of the ginger without affecting the objectionable resinous matters, we have examined the action of cold water, proof-spirit, and rectified spirit on a number of samples of ground ginger of commerce. The following results were obtained by Mr. Haywood Court. Sample *A* was known to be genuine, but most of the others were purchased under the Sale of Food and Drugs Act, and some of them were ultimately admitted to contain an admixture of exhausted ginger.

	<i>A.</i>	<i>B.</i>	<i>C.</i>	<i>D.</i>	<i>E.</i>	<i>F.</i>	<i>G.</i>	<i>H.</i>	<i>I.</i>	<i>J.</i>	<i>K.</i>	<i>L.</i>	<i>M.</i>
Total ash, . . . . .	3'54	5'23	4'41	5'15	5'53	7'69	5'39	3'61	3'19	2'72	3'52	3'29	4'50
Ash soluble in hot water, . . .	2 36	2'59	2'22	2 57	2'87	2'36	—	1'24	1'45	0'69	1'11	0'97	1'37
Alkalinity of soluble ash as $K_2O$ , . . . . .	0'96	0'96	0'29	0'13	0'15	0'20	—	0'27	0'20	0'23	0'23	—	—
Extracted by rectified spirit, . .	7'33	7'70	7'37	6'22	8'45	—	4'65	7'09	—	6 83	7'86	—	—
Extracted by proof spirit, . . .	21'64	20'80	10'70	10'45	7'55	21'60	5 85	13'00	16'08	11'78	12'38	—	—
Containing ash, . . . . .	20'25	18'58	—	—	—	—	—	2'30	2'47	1'91	2'24	—	—
Extracted by cold water, . . . .	—	2 73	—	—	—	—	—	8'33	9'78	8'51	7'18	8'08	7'39
Extracted by subsequent treatment with proof spirit, . . .	14'57	13'16	14'95	14'55	14'50	14 60	8'14	—	—	—	—	—	—
Extracted by subsequent treatment with rectified spirit, . .	9'77	9'59	—	—	—	7 49	—	8'35	8'51	7'76	8'42	—	—
Total extract by three solvents used consecutively, . . . . .	1'11	1'28	—	—	—	1'31	—	1'58	0'98	1'28	1'71	—	—
	25'45	24'03	—	—	—	23'40	—	18'25	19'27	17'55	17'31	—	—

From these results it appears that the percentage of matter extracted either by proof or rectified spirit affords very little information, the large proportion of resinous matters yielded both by genuine and exhausted ginger masking any minor differences. It is true that Dyer and Gilbard consider that the proportion of matter extracted by alcohol after complete removal of the ethereal extract is a valuable item to the analyst; but as they found it to range from 2·1 to 3·8 per cent., while in the exhausted samples it varied from 0·8 to 1·4 per cent., it is evident that any estimate based on this datum must be of a very rough kind.

On the other hand, the proportion of extractive matter yielded to cold water seemed very encouraging, since the amounts dissolved in most cases followed closely the proportions of soluble ash. The following figures were obtained by Mr. R. Waterhouse by the analysis of genuine ginger of known origin, supplied to us by the kindness of Mr. W. Chattaway, of Apothecaries' Hall:

Origin of Ginger.	N.	O.	P.	Q.	R.	S.	T.	U.	V.	W.	Average.
	Jamaica.	Jamaica.	Jamaica.	Jamaica.	Jamaica.	Cochin.	Cochin.	Cochin.	African.	African.	
Moisture, . . . . .	11'26	10'98	13'95	12'76	13'96	10'64	13'50	13'23	15'97	13'70	13'00
Total ash, . . . . .	—	—	3'90	3'29	3'45	—	3'81	3'62	3'66	3'90	3'66
Soluble ash, . . . . .	1'70	1'41	3'05	1'75	1'71	1'71	2'03	2'04	2'28	2'41	2'01
Cold-water Extract, . .	15'65	13'25	14'40	12'25	11'85	13'00	8'65	11'65	10'80	10'10	12'12

Somewhat closer figures are obtainable by calculating the results on the moisture-free samples, but even then the figures show a good deal wider variation for the soluble ash than was observed by Dyer and Gilbard, while the cold-water extract also shows a wider range than we had expected. Sample *T* presents the peculiarity of yielding the average proportion of soluble ash, but an abnormally low water-extract. On the other hand, sample *O*, which gave the lowest soluble ash, yielded a cold-water extract above the average.

It appears, therefore, that neither the soluble ash nor the cold-water extract affords by itself a perfectly safe means of deciding as to the presence of exhausted ginger, but by a combination of the two data it is possible to arrive at a more definite conclusion.

More extended observation is needed before anything like a definite limit of composition can be assigned to genuine ginger, and hence it is desirable to leave a wide margin when stating the proportion of exhausted ginger present in a sample. But, meanwhile, there is no difficulty in ascertaining the presence of the adulterant when it has been added in such quantities as to bring the soluble ash down to something like 1 per cent., and the cold-water extract to less than 8 per cent.; and this is the case with not a few gingers in the market. The adulteration has been admitted in several cases of this kind which have come under our notice.

We have pleasure in acknowledging the valuable assistance rendered by Mr. H. Court and Mr. R. Waterhouse in making the experiments above recorded.

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Dr. K. J. Bayer claims to have discovered a new element in French beauxite.  
 —(*Chem. Zeitung*, 18, 671).

THE BENEFICENT SOCIETY OF AMERICAN APOTHE-  
CARIES OF THE STATE OF PENNSYLVANIA.

BY WILLIAM B. THOMPSON.

Read before the Pennsylvania Pharmaceutical Association, June 15, 1894.

The Pharmaceutical Association of the State of Pennsylvania has been now existent 17 years. During this time it has progressed in all the objects and purposes of its organization. It has maintained an increasing enrollment of members. The usual causes of decimation have not materially lessened its ranks. Active, personal interest has at all its sessions been conspicuous. Its work and influence have extended to other and similar organizations, and its zeal has proven a stimulus to our brethren elsewhere, to prosecute similar labors in other fields. It has sought to give, through the copious literature of its many papers on scientific and practical subjects, information of value to its members. In this way education has been diffused among a large number. The social features of an organization of its kind have created many personal friendships, and cemented a bond of fraternal union, based upon the evidences of unselfish motives, and the courtesies and amenities of a polite intercourse. It has carefully guarded legal privileges and sought to throw around the prosecution of a responsible business the rights and dignities which should pertain to it. But one essential act yet remains unaccomplished. It should identify itself with some well-formulated scheme of benevolent purpose, so that its ministrations may be characterized by the exercise of humane feeling, and each and every one who may by reason of fortuitous circumstance become its beneficiary, have reason to feel that the Pharmaceutical Association of the State of Pennsylvania is a living, moving, acting instrumentality, not for the promotion of selfish interests merely, but for good and virtuous objects as well.

The formation of Guilds, which were associated bodies of craftsmen and others, dates far back in the industrial and commercial history of England. For the purpose of effecting common objects by weight of numbers and of influence, to protect material and mutual interests, and to regulate the status of particular occupations, constituted the original design ; the value and force of combined effort was then well understood, as well as the utter inability of single individual influence to right wrong successfully or combat error.

From these sprang the aggregation of numbers known as Societies, Orders, and organizations under various titles, the outgrowth of which has extended into all civilized communities, and has become not only a local power, but, when forces are intelligently marshalled, a potent factor in shaping public measures and controlling policy. Our topic here, however, has to do with a particular feature, which may either become a distinct purpose or may be incorporated with the general objects of such associations. This is a plan of humane and benevolent intent, and has become a permanent auxiliary or the sole and single purpose of united bodies. Therefore, the scheme of a "Benevolent Society of American Apothecaries" is new only in name and title, the principle having long been well established. The subject is one which deserves consideration, and under determined effort might readily be expanded into a far-reaching method of beneficence. One impediment would confront at the outstart, and that is that there never has been manifested among the body of apothecaries any tendency towards fraternization, if we except certain organizations to promote trade interests, but no conceptions or appreciation of higher plane of moral purpose has ever characterized the representatives of this calling. The history of all unendowed benevolent enterprises emphasizes the fact that these are of slow and patient growth. There is nothing to discourage, therefore, an effort at beginning. Faith and labor can overcome all ordinary difficulties, and where these are stimulated by a knowledge of a worthy and virtuous object to be obtained, hope will never languish. Under our free laws of unrestricted trade, the increase in occupations goes on in large ratio, and that of the apothecary is certainly no exception. Its votaries may be found everywhere, in large and small communities, in an excess of numbers greatly exceeding the possibilities of prosperous business existence, yet each individual, free to exercise his choice, adds one more to an already over-augmented number. Failure to realize expectation and consequent disappointments must multiply in the same ratio, and one day there comes a realization that labor, though long-continued, patient and faithful to a degree, has yet been in vain. Sad is it for him whom this day finds unprepared. The occupation of the apothecary is somewhat peculiar, in that it seldom leads to the adoption of other employment, and once embarked in, the individual clings and settles into a seemingly fixed groove and purpose. This, too, often under circum-

stances which the observer plainly notes are the most discouraging and unsatisfactory. It may be that the not over-ambitious mistake it as an occupation of comparative ease, imposing nothing which is exacting or imperative; but even if so, it is still the failure and no less a labor unrequited. The knowledge of this often comes too late in life's experience to retrace steps, to rectify or recall. This result is not exclusively the fate of the apothecary, but is likewise met with in all the other avenues of business life. Conditions, however, for the past few years have been adverse to the prospects of the apothecary. The shifting uncertainties of mercantile life—controlling causes which cannot be averted—the vicissitudes of fortune, the errors of judgment, mistaken, the generous hand that helps another often ruined in the benefaction—all contribute in one way or another to make the sum of life's adversities, and these we all have to meet as best we can. How wise, then, to unite for mutual aid. When these adversities have swept in like successive, devastating tides, carrying away all that has been won by toil and accumulated by patience, surely such a lot appeals keenly to our most tender sympathies. The hand which bestows need not be seen, and the hand which now receives has, through the instrumentality of union, extended like benefactions to others; the spirit of pride is not, therefore, wounded, and that sensitive nature already sharpened by the fear of mortifying disclosure, not hurt even at the point of penury. Days will assuredly come to many a worthy brother now striving, when the weight of years and the shadows of the evening of life will begin to fall heavily on body and mind. Some of us will then be found unprepared to soften the asperity of want with the comfort of means, or to provide adequately against the adversities of poverty and helplessness out of resources too meagre. To such how consoling and timely would come the helping hand of benefaction—not seen, yet gratefully felt in the fulness of a generous bestowal.

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## NOTES ON PRACTICAL PHARMACY.

BY JOSEPH W. ENGLAND, PH.G.

Read before the Pennsylvania Pharmaceutical Association, June 14, 1894.

"*C-C*" *Cough Mixture*.—Under this name, a cough mixture is very largely used in the phthisical wards of the Philadelphia Hospital. It has, in each fluid drachm, the following: Codeine sulphate,



one-eighth grain; diluted hydrocyanic acid, two minims; spirit of chloroform and mucilage of acacia, each, fifteen minims, and syrup of wild cherry, a sufficient quantity to make one fluid drachm. Dose: one fluid drachm.

*Distilled Extract of Witch Hazel.*—The writer has been informed, on good authority, that the percentage of alcohol in commercial distilled extract of witch hazel is not necessarily an index of its value, for the reason that some dealers buy the cheaper aqueous distillate from the distiller and add alcohol. The only proper product is had by distilling the fresh twigs with a mixture of alcohol and water, whereby a greater quantity of volatile oil is brought into solution, than by distillation with water alone.

*Syrup of Wild Cherry.*—In making this syrup, more especially in the summer season, when fermentation takes place readily, it is advisable to add some of the sugar to the percolate as soon as possible, to prevent change. The pharmacopœial formula of 1870 contained no glycerin, that of 1880 ordered five per cent., and that of 1890 fifteen per cent by volume. This last increase seems excessive. The greater the percentage of glycerin, the greater the amount of tannin extracted, up to a certain point. It is a question whether this increased astringency in the syrup is therapeutically desirable.

*Blaud's Pills (Improved).*—The usual formula for this much-used unofficial ferruginous preparation of ferrous sulphate, potassium carbonate, tragacanth and glycerin, can be much simplified and made to yield a more permanent product by using the following formula: Potassium carbonate, one-third grain; potassium sulphate, two grains, and mass of iron carbonate, three grains, in each pill. Little or no excipient is required. The pills flatten somewhat on keeping, and are best dispensed in gelatin capsules. They are small in size, and do not become hard and reddish-brown on fracture, as do those made by the old formula.

*Ointment of Ammoniated Mercury.*—This ointment is most difficult to make by the official process and secure entire freedom from "grit." The best method is, for example, to finely powder in a mortar 48 grains of the mercury compound and beat it into a smooth paste with 12 grains of glycerin; and make the official ointment from this, as wanted, by admixing one drachm with seven drachms of cerate. In this connection, criticism may be made

against the use of alcohol, as in the 1880 Revision, or olive oil, as in the 1890 Revision, to render veratrine smooth in making veratrine ointment. A small quantity of glycerin is better. Glycerin is also of superior utility in softening extract of belladonna prior to making it into ointment; the Pharmacopœia specifies diluted alcohol.

*Mucilage of Sassafras Pith.*—This mucilage is best made by beating the pith, in a wedgewood or porcelain mortar, with a small quantity of *sterilized* water until it gets pasty, expressing through cheese-cloth, returning residue to mortar, adding more of the water and continuing as before. In this way, in a short time, a dense and syrup-like mucilage may be had, very different in physical appearance from the watery product gotten by following the official directions of simple maceration in *water* for three hours and straining.

As this preparation is used as an emollient in inflammatory conditions of the eye-ball and mucous membranes, it is obvious that the greater the percentage of mucilage in solution, the more soothing it will be. In these days of asepsis, the use of *water* in making the official mucilage is an unpardonable sin in the eyes of oculists. Sterilized water, *i. e.*, water or distilled water boiled and cooled, only should be employed. Three hours' time in making the preparation is far too long, when it can be better done in a few minutes.

*Hope's Camphor Mixture.*—This old preparation has been gradually increasing in use, and is recognized by the National Formulary under the name of *Mistura Camphora Acida*, which authority follows the formula of Ellis (Griffith's Formulary, 1866, p. 160) in using *nitric* acid. The original formula of Hope, however, specified *nitrous* acid. The formula we have used for years is: Fuming nitrous acid, 2 fluid drachms; tincture of opium, 80 minims, and camphor water, 1 pint. Parrish's Pharmacy (1884) refers to the mixture as follows:

"This formula was originally made public after twenty-six years' experience of its use in dysentery, by Thomas Hope, Esq., surgeon, Chatam, in the Edinburgh Medical and Surgical Journal, January, 1824. Dr. Hope was in the habit of directing *nitrous* acid, *not* nitric, which he says he has 'not found to produce any good effect.' I have been careful to follow his formula literally, and have for the purpose prepared nitrous acid by the process given on p. 200;

though nitrous acid passes into nitric acid by contact with water, this reaction does *not* occur in the presence of an excess of nitric acid. Few remedies have a more general and widespread reputation than this; it is now frequently prescribed, more than eighty years after its virtues were originally discovered."

The nitrous acid used is known in commerce as fuming nitrous acid or fuming nitric acid. It is really nitric acid holding in solution nitrous acid fumes, which latter may be wholly removed by boiling, or largely by simple and continued exposure to air; so that the commercial product varies considerably in strength of absolute nitrous acid.

Remington's Pharmacy (1885), p. 1027, specifies nitrous acid in the formula for this mixture, as does also the National Dispensatory of 1884 (p. 75) and 1894 (p. 76). Hope's Camphor Mixture is still largely used, at least with us, in summer dysenteries, and if Mr. Hope's contention as to the necessity of using only *nitrous* acid, *never* nitric, is correct, then the National Formulary decidedly errs in following the formula of Ellis and specifying the latter.

The objection sometimes raised as to the difficulty of securing good fuming nitrous acid can be met. The pharmacist can easily make his own nitrous acid, extemporaneously, from sodium nitrite and nitric acid, using quantities sufficient to yield the amount of acid in the formula, which is small. Messrs. Rosengarten & Sons state that sodium nitrite of the new official strength (97.6 per cent.) is readily obtainable.

*Medicated Waters.*—In the making of medicated waters—save those prepared by distillation or direct solution—the new Pharmacopœia directs precipitated calcium phosphate as the distributing medium in about the same proportion as that directed for magnesium carbonate in the 1870 issue. As was pointed out by the writer ten years ago (A. J. P., 1884, p. 65), in advocating the use of precipitated calcium phosphate for this purpose, it is essential, in order to properly distribute the oil, that the lime compound be used in *double* the quantity of magnesium carbonate usually employed, on account of its much less bulk. The official quantity of the lime compound should be 8 gm. to the 1,000 cc. of the medicated water, and not 4 gm., as directed.

It is best to add, as the Pharmacopœia directs, *all* the water to the admixed lime compound and oil before filtration. The practice

of some pharmacists adding only a *part* of the water, throwing on a filter and then adding further water, from time to time, to the contents of the filter until the required amount has filtered through, cannot result in as strong a solution as if the oil had been brought in intimate contact with all the water at once.

There is one detail whereby the official process can be greatly improved, and that is by using in place of the distilled water, *hot, boiled* water, *i. e.*, water boiled and cooled to a point just short of boiling. In following this practice, the writer adds the water to the admixed lime compound and oil, places it in a proper vessel, covers tightly and filters after it has stood for some hours, preferably over night.

The use of hot, boiled water has a number of very decided advantages. These are a maximum solution of the oil and an increased permanency of the water. Boiled water is far more germ-proof than the usual distilled water of commerce, which is believed to be, in some cases at least, simply condensed steam-waste.

Criticism may be made against the use of nearly boiling water for making aromatic waters, on the ground of loss of volatile oil, but practical experience will show that this loss is more apparent than real, that the amount of volatile oil lost by volatilization is insignificant in comparison with the greatly increased amount brought into solution.

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## PHARMACEUTICAL NOTES.

BY CLEMENT B. LOWE.

Read before the Pennsylvania Pharmaceutical Association, June 14, 1894.

*Terebenum* or *Terebene* has come into somewhat extensive use as a remedy for chronic bronchitis, and it is frequently an ingredient of cough mixtures, or is prescribed by itself.

On account of its slight solubility in water, and its somewhat unpleasant taste, it is best given in an emulsion.

The emulsion should be made by the addition of one drachm of powdered gum arabic for each fluid drachm of terebene.

The primary emulsion, consisting of gum and water, should first be carefully prepared and then the terebene should be slowly and carefully added.

The emulsion will be found quite a difficult one to make, the terebene being easily thrown out of solution.

*Mustard Plasters.*—The mustard plaster is one of the most important remedies kept in our pharmacies, and yet as far as I know none of the manufacturers have included in their directions that of wetting the plasters before using with only *tepid* water.

The acrid or volatile oils of mustard do not pre-exist as such in the seed, but are produced by the splitting up of the glucosides sinalbin or sinigrin, by the action upon them in the presence of moisture of the ferment called myrosin.

It is a fact that should be better known that myrosin is coagulated by water of a temperature of 140° F., and rendered incapable of action.

I have found that many people are under the impression that the plaster will be made the more active by dipping it into hot water, but the reverse is the case.

*Syrup of Acacia.*—It seems strange that the Pharmacopœia should have continued unchanged the formula for Syrup of Acacia.

In the Pharmacopœia of 1870 the syrup was made directly from the gum, and we had a fairly stable preparation.

In the last two Pharmacopœias it is ordered to be prepared from the mucilage, which spoils quickly, and the syrup thus made would ferment in a few hours, unless the mucilage was freshly prepared.

The formula of Mucilage of Acacia can be improved upon by the use of chloroform water of the strength given in the British Pharmacopœia.

If the chloroform is objectionable from a therapeutical standpoint, a few minutes' exposure to heat will thoroughly dissipate it.

The most convenient way of dissolving the gum is by means of a dialyser.

*Adulteration of Belladonna Root.*—This last winter, on examining some belladonna root, I was surprised to find present a number of large pieces of poke root.

As the former root is indigenous to Europe and the latter to the United States, and as the structure of them is entirely different, it could hardly have been an accidental adulteration.

The cork layer of the belladonna is of a very light brown gray color, while that of the poke root is of a yellowish brown gray and marked by very characteristic transversely elongated corky warts of a lighter color.

The transverse section of the former shows a fine black cambium

line, and the woodwedges, when present, are of a light yellow color, radially arranged; in the poke the wood tissue is whitish, and shows a decidedly concentric arrangement.

*Camphor*.—I have pleasure in calling to your attention an excellent article of camphor, made at the Sumitomo Refinery, Kobe, Japan, and imported by Smith, Kline & French Company.

It comes in boxes very neatly made of wood, pasteboard lined, containing one pound net by actual weight.

The style of package prevents evaporation, and being divided into ounce cakes there is no loss in retailing.

It is less translucent and crystalline than ordinary refined camphor, and is probably made by submitting powdered camphor to powerful pressure.

One part is perfectly soluble in 0.7 parts of alcohol, and sublimes without leaving any residue.

It seems probable that in many industries Japan is going to be an active competitor, not only with European nations, but also with our own.

*Fluid Extract Triticum Repens*.—The question is asked in Query 8, "What is the cause of the active effervescence which takes place when Fluid Extract Triticum Repens is added to a carbonate?"

If active effervescence occurs, I should think it due to fermentation having taken place.

The fluid extract is made by first percolating with boiling water, afterwards evaporating and adding 25 per cent. of alcohol.

As the medicinal constituents consist of three sugars, two of them directly fermentable, if too much time be taken in percolating and evaporating, there is apt to be some fermentation before the alcohol is added.

*Bicycling*.—I was much interested in an article on "The Bicycle in its Relation to the Physician," by Dr. S. Egbert, and think it worthy of a wide circulation.

I was pleased to find that his professional investigation of the subject coincided with my personal experience.

He claims that "if the wheel is properly adjusted to the rider, as far as weight, saddle, handle-bar and pedals are concerned, and above all an *erect posture maintained*, that cycling is one of the best forms of exercise attainable, developing the chest, increasing the lung capacity, and bringing into play the most important muscles of the body.

If bicycling is so beneficial to the physician, who ordinarily gets much more out-door exercise than the pharmacist, will it not be of greater value to the latter?

A well-known apothecary of Philadelphia, who has suffered since a lad from an injury to one of his legs, claims that in all those years he has never been absolutely free from pain until he took to riding a bicycle.

A prominent clergyman of the same city, who is quite a student, says "that the more he studies the more he has to ride to equalize matters," and further says, "who would for a moment ride in a carriage if possible to ride on a wheel?"

Some advice may be of value, especially to beginners.

Don't let your bump of self-esteem outgrow your bump of caution.

A clerk of mine learned to ride fairly well in one afternoon; on his second trip he did so well that he thought every one was looking at him, but, having to pass a wagon that provokingly kept in the middle of the road, he got nervous, wobbled, ran into the hind wheel, took a header, cut his leg to the bone, and was laid up for repairs for three weeks.

*Don't overdo it*, especially at the start; you will hear so much about century runs that you will be tempted to ride further than your strength will allow, and so will become exhausted instead of invigorated. Unless a daily rider, 15 to 25 miles of an afternoon will be amply sufficient.

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## REPORT OF THE COMMITTEE ON U. S. PHARMACOPŒIA TO MISSOURI STATE PHARMACEUTICAL ASSOCIATION.<sup>1</sup>

BY CHARLES O. CURTMAN, Chairman.

The writer has the honor to report the following in regard to the United States Pharmacopœia:

The committee elected by the national convention for revising the Pharmacopœia, held in Washington, D. C., in May, 1890, has during the past year completed the work of the seventh revision intrusted to it, and in August, 1893, the first copies of the work

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<sup>1</sup> Read before the Missouri Pharmaceutical Association, June 12 to 15, 1894.

were exhibited at the meeting of the American Pharmaceutical Association at Chicago, and an edition of 8,200 copies was placed upon the market. This supply was soon exhausted and was followed by a second edition of 5,000 copies, and again in 1894, a third edition of 5,000 had to be printed, and a large portion of these is already sold.

Altogether the reception of the work has been a favorable one both at home and abroad. Criticisms have been published in a number of journals, some of them censuring the committee of revision for introducing or omitting features, which were not in the power of the committee to control, as their action was limited by the instructions on the convention which elected the committee. Among the omissions especially censured was the non-introduction of a number of modern synthetic chemicals, such as antipyrin, phenacetin, sulfonal, etc., which are received into European pharmacopœias. Many of the members of the committee of revision were in favor of their admission, but the stringent rule, number 6, adopted by the convention, forbade this, and the only remedy for those who wish such preparations introduced will be that the delegates to the next convention give greater liberty of action to the committee they may then elect.

Another objection dwelt on by some critics was the failure of stating the doses of the remedial agents, or at least the maximum doses of very active and poisonous preparations. This question was also under discussion in the convention, and though no formal restriction was placed upon the committee of revision, the sentiment expressed in the convention was so unfavorable to the introduction of doses that it was not deemed prudent to contravene it.

As in all large publications, a number of misprints have happened and have been discovered too late for correction in the plates of the first edition. In spite of all care and the most painstaking proof-reading, such mishaps will always occur and are more liable to be overlooked where the authors of the book live distant from each other and from the place of publication. Unless the printing is to be unduly protracted, only a limited time can be given to reading the proofs, and this is much shortened when they are to be sent and returned by mail. In spite of many vigilant eyes, not only of the editor and the whole committee, but also of the outside assistants, a few errors were permitted to pass. Fortunately they were mostly



unimportant, such as each reader would readily correct when noticed, and a list of errata has been published to enable the purchasers of the first edition to correct them. The plates have at once been corrected so that the errors are eliminated from the later copies.

Since the publication of the Pharmacopœia the committee of revision has not been idle. Its active chairman, Dr. Charles Rice, with the consent of all of the members, has organized "Research" committees to engage in preparatory work in aid of the next revision. Thus far, four such committees have been organized:

Research Committee A. Subject, The feasibility of devising practical methods of assay for drugs containing no sharply defined proximate principles capable of being separated in a sufficiently pure state (such as ergot, digitalis, rhubarb, etc.).

Chairman: Dr. W. M. Mew.

Research Committee B. Subject, Revision of the description and tests of inorganic chemicals, including salts of inorganic bases with organic acids. Revision of the volumetric assays of the U. S. P. Study of the proper limits of purity or strength of chemicals, now official, or likely to become so hereafter.

Chairman: Dr. Charles O. Curtman.

Research Committee C. Subject, Inquiry into the feasibility of incorporating into the U. S. P. methods of identifying such drugs as may be found to permit of it, in a powdered condition.

Chairman: Dr. H. H. Rusby.

Research Committee D. Subject, Revision of the description and tests of organic chemicals.

Chairman: Dr. Charles Rice.

The members of these committees are to be selected hereafter and other committees are to be organized as occasion may arise. The results of the researches of these committees are to be reported to the whole committee of revision and may be published by the authors, provided they state that the papers are reports of U. S. P. Research Committees. This will secure to the profession an early knowledge of these researches and an opportunity to repeat the experiments and verify or controvert them.

In conclusion the undersigned would urge this association to take early action in considering all matters connected with the next revision of the U. S. Pharmacopœia. Neither the pharmaceutical nor

the medical profession is likely to lag behind in the progressive spirit of the age. New methods are being introduced requiring new agents of medication, obsolete preparations are discarded, other standards of strength or purity may become advisable, and all of such matters require careful study and discussion, and should not be left to be decided at the last moment in a pharmacopœial convention.

The wishes of this State association should be clearly ascertained in regard to the admission or rejection of certain preparations, in regard to inserting the doses of active remedies, to processes of manufacture or assay of galenical preparations and any other matters connected with our national Pharmacopœia, so that when the time comes to select delegates, they may be apprised of the wishes of the profession and not left to their personal impressions and the impulse of the moment when called upon to cast their vote for the rules guiding the next committee of revision.

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DO DRUGS SUPPLIED BY THE JOBBER COMPLY WITH  
PHARMACOPŒIAL REQUISITION? IF NOT, WHO IS  
RESPONSIBLE, THE JOBBER OR THE RETAILER?

BY LOUIS EMANUEL.

Read before the Pennsylvania Pharmaceutical Association, June 15, 1894.

OLEUM SANTALI.

Have you changed the quality of the sandalwood oil you dispense? This was the question put to a pharmacist by a physician for whom he had been preparing oil of sandalwood capsules. The reply was, "I don't know that the quality of the oil now being used is of a different quality from that used before, but I do know that I bought it from a different source, and paid two dollars a pound more for it."

"Well," said the doctor, "I thought there was something wrong, for my patients get well surprisingly quick of late; I attributed it either to the quality of the medicine or to a mildness of the disease."

The oil which brought out the above observation was purchased from a well-known perfumer and dealer in essential oils, at the cost of nine dollars a pound. It was pale yellow in color, or rather nearly colorless, and very soluble in a mixture of 3 parts alcohol and 1 part of water at 20° C.

The Pharmacopœia describes oil of sandalwood as "a pale yellowish or yellow somewhat thickish liquid, etc. If to 1 cc. of the

oil at 20° C., there be added 10 cc. of a mixture of 3 volumes of alcohol and 1 volume of water, a perfectly clear solution should be obtained."

R. A. Cripps, from the results of extensive labors of his own, and those of other workers, suggests that the official description of the character and test of the oil should be modified as follows: Thick in consistence, pale yellow or nearly colorless, etc. At 15.5° C. it forms a clear or at most a faintly opalescent solution with five times its volume of a mixture of five parts rectified spirit with one fluid part of distilled water.\*

M. E. Mensard says pure oil of sandalwood with sulphuric acid forms a viscid liquid which becomes pasty and is rapidly transformed into a solid mass adhering to the glass. The mass is easily recognized by its light, grey blue or greyish color, and dusty appearance it assumes with age. In adulterated specimens the resinous mass does not solidify and remains of a deep tint with a very distinct lustre.

For a long time oil of sandalwood has been purchased by me from one source. Partly on account of the want for an official test, and also partly on account of faith in the jobber, no tests were applied. This, however, did not prevent the precaution of reserving a portion of the oil purchased from time to time with a view of a comparative examination at some future period. Six samples of oil thus purchased, together with a sample from a different source, along with Santal Midy and a sample of West Indian oil were subjected to the solubility and sulphuric acid tests, with the following results:

No.	Soluble in a mixture of alcohol 3 parts, water 1 part, at 20° C.	With H <sub>2</sub> SO <sub>4</sub> forms	Price.	Color.
			per lb	
1 . . . . .	not soluble.	brownish mass.	\$7 00	{ distinctly yellow.
2 . . . . .	soluble.	brownish grey mass.	7 00	{ low.
3 . . . . .	not soluble.	{ oil globules surrounded by a garnet liquid. }	7 00	{ pale yellow.
4 . . . . .	"	{ brownish grey, with oil globules. }	7 00	{ " "
5 . . . . .	"	{ oil globules surrounded by a garnet liquid. }	5 25	{ yellowish, al-
6 . . . . .	"	{ brownish grey, with oil globules. }	4 50	{ most colorless.
7 . . . . .	{ 1 cc. soluble in 4 cc. } { of alcohol mixture. }	greyish mass.	9 00	{ pale yellow.
Santal Midy .	opalescent.	"		
W. Indian .	not soluble.	{ oil globules surrounded by tinted liquid. }	3 50	{ " "

\* Proceedings Am. Ph. Ass., vol. 41.

Number six was purchased recently, and when complaint was made that it did not meet with Pharmacopœial tests, the seller proposed to exchange it for better quality.

## CUBEBA,

the Pharmacopœia says, is the unripe fruit of *Piper cubeba*. The oleoresin is official, and when prepared from the unripe fruit it is of a greenish color. Recently an Eastern firm sold powdered cubebs, the color of which was of a lighter shade than is usually met with. Upon examination it produced 18 per cent. of oleoresin of a brown color; this fact was brought to the notice of the seller, who made the following reply: "the Pharmacopœia requires the unripe fruit, but that is rarely found in the market; the regular article of commerce is the ripe fruit, which, of course, has less chlorophyll or green color than the unripe berries should have. We consider the cubebs which we carry in stock of as prime quality as can be found in the market."

## FERRI PYROPHOSPHAS.

A pharmacist got himself into quite an unpleasant controversy through being unable to produce a clear mixture from the following prescription:

R    Ferri Pyrophosphatis,  $\mathfrak{z}$  iv.  
      Acid. Phosphorici Dil., f  $\mathfrak{z}$  i.  
      Syr. Calcii. Hypophos., f  $\mathfrak{z}$  iii.

This combination the physician claimed always produced a clear mixture when compounded by the pharmacist's competitor, this pharmacist, it appears, used iron pyrophosphate of a different maker, and when this pyrophosphate was used no difficulty was experienced. Upon examination of two samples of iron pyrophosphate, both contained iron phosphate and one of them contained an ammonium salt, possibly the citrate.

Upon whom rests the responsibility—the jobber, because he does not take due precaution to supply drugs of pharmacopœial standard, or the retailer, because he does not examine his purchases and insist upon having them comply with official tests?

## RECENT CONTRIBUTIONS TO PHARMACY.

### NOTE ON LEMON AND ORANGE PEEL.

In a paper before the Society of Public Analysts, E. G. Clayton (*The Analyst*, 19, 134), has noticed that when orange peel is moistened with strong hydrochloric acid, its color changes from yellow to a rich, dark green; lemon rind, similarly treated, retains its hue, or, at most, assumes a dingy, yellowish-brown tint. A convenient and simple chemical test, therefore, which will distinguish between small fragments of lemon and orange peel is to touch them with a glass rod previously dipped in hydrochloric acid. The diluted acid will answer the purpose, but the reaction is slower. A few minutes' exposure to hydrochloric acid gas will effect this change in the pigment of orange peel. The color of lemon rind is unaffected. The shades of green developed by dilute hydrochloric acid are deepest in the cases of Mercia, Denia and Florida oranges; of moderate intensity with Jaffa and "blood" oranges; and feeble with Valencia and Tangerine oranges. This statement also applies to the reactions with *strong* hydrochloric acid, except that the color of Tangerine orange peel with the strong acid is perhaps more intense than that observed with any of the other varieties of the fruit. The peel of the lime behaves, with hydrochloric acid, like lemon rind.

Mr. Hehner remarked that it was not at all an infrequent occurrence for lemon and other peels to be artificially colored. He thought that at present too implicit reliance should not be placed on this test in the case of candied peel.

### DETECTION OF COPPER IN GREEN PRESERVES.

A. Tschirch (*Zeit. anal. Chem.* 34, 103) gives the following process for determining whether the green color in certain preserved foods is due to chlorophyll or to copper phyllocyanate.

An alcoholic extract is evaporated to dryness, the residue washed with water, and then treated with concentrated hydrochloric acid. Pure chlorophyll gives a deep blue solution, and a residue soluble in ether with a brown color, but hydrochloric acid dissolves only a small amount of a yellow substance when copper phyllocyanate is present, and the residue dissolves in alcohol with a green color. If dilute hydrochloric acid is added to the alcoholic solution, a green color indicates copper, used in its absence, the mixture is yellow.

## EDITORIAL.

## THE IMPERIAL PHARMACOPŒIA.

Last February, in a paper before the Pharmaceutical Society of Great Britain, Professor Attfeld proposed that the next British Pharmacopœia should be so framed as to include all the English Colonies, and in that event it should be known as the "Imperial Pharmacopœia." This suggestion appears to have been acceptable to the Society.

Sufficient time has now elapsed for us to observe the nature of the reception which has been accorded to the proposition, by Canadians, as well as by our own countrymen.

We regret that there is a disposition on the part of some to take a narrow view, in which so-called national pride (or better, selfishness) is most prominent, rather than to treat the subject strictly on its merits.

In considering this question, no political issues should for a moment be entertained. It matters little to the pharmacists of the United States, whether our Pharmacopœia is used in Canada or not; but to the Canadian pharmacist, the announcement that he is to have a Canadian Pharmacopœia, cannot but be acceptable. He will then be somewhat relieved of the difficulty he has heretofore experienced in having a legal standard, to which he could scarcely conform in every case.

Professor Attfeld stated that the United States Pharmacopœia is a strong competitor. Just how a standard is to be created, which will serve for England and all her colonies, is not clear, but we have no doubt that British brains and ingenuity will accomplish the desired result.

The chief satisfaction we shall derive from the change will be in having the Canadian Pharmacopœia as a connecting link between our own standard and that of Great Britain, by which all will tend to approach one system in weights and measures, as well as in strength of preparations.

Let us then, not become excited by such sentiments as the following, which recently appeared in the *Western Druggist*: "The acknowledged superiority of the U. S. Pharmacopœia, 1890, to any foreign pharmacopœia, and the favor the adoption of the metric system will receive from the French Canadians, suggests that in a few years the majority of Canadian pharmacists will be pharmaceutically annexed to the United States through the use of the U. S. Pharmacopœia."

These effusions would sound fairly well in an after-dinner speech, but in cold type they become ridiculous. It is doubtful if any notice should have been taken of these remarks, but the *Chemist and Druggist* has seen fit to make a neat reply under the title of "The Spread-Eagle Pharmacopœia." We are therein informed that Canadians themselves will have a hand in compiling this Pharmacopœia, and that it will be made official in Canada when it is published. This is a gentle way of reminding us to mind our own business, and we will do well to give heed to the advice.

## LEGISLATION TO GOVERN THE SALE OF PATENT MEDICINES.

The title of Mr. Redsecker's paper (p. 333), "The Cutter and the Remedy," may appear rather unprofessional, but, on reading beyond the title, it will be seen that if the suggestions there offered are carried out, the patent medicine

will become a thing of the past. Perhaps no paper at the recent meeting of the Pennsylvania Pharmaceutical Association drew out so much discussion. The chief objections urged against the proposed bill were the difficulties in the way of it ever becoming a law.

In the meantime, if every druggist will persist in advising the public against the use of secret remedies, and offer his own preparations, the wrong will gradually be righted, and the loser will be the patent medicine manufacturer.

F. A. FLÜCKIGER.

Professor Flückiger is making an extended tour through the United States. On June 16th, in company with Dr. E. R. Squibb, he visited the Philadelphia College of Pharmacy. A number of the officers and members of the College had assembled in the Library to meet them, and, after introductions, a few hours were given to the inspection of the building. The distinguished visitors devoted most of the time to the Laboratories and Museum; in the latter room the Martindale Herbarium was examined to considerable length. It was evident to all present that Professor Flückiger has an extended knowledge of a great variety of subjects, a very important one being his complete mastery of the English language.

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## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*Principles and Practice of Agricultural Analysis.*—By Harvey W. Wiley, Chemist of the U. S. Department of Agriculture. The Chemical Publishing Co., Easton, Pa.

Dr. Wiley has undertaken to furnish for publication forty-eight pages monthly. The first number appeared in January of this year; and it is proposed to complete it about the last of next year.

So far as can be judged from the first five issues the subject is treated exhaustively. Commencing with the chemical elements, the author gives a concise description of each. Then follows a consideration of soils and their analysis.

The subject is treated in a logical and scholarly manner, which indicates that the author is thorough master of it, acquired by his long and creditable term of service in this particular department of chemistry.

Agriculture and pharmacy cover much ground in the field of science that is common to both; this especially applies to plant chemistry, and in detailing new processes for the use of the agricultural chemist, the author will be at the same time equally assisting the pharmaceutical investigator. No department of chemistry in America is so deficient in standard books as this one, and no one is so well adapted to supply that deficiency as Dr. Wiley.

*Leitneria Floridana.*—By Dr. William Trelease. Printed in advance from the sixth annual report of the Missouri Botanical Garden. 26 pages and 15 plates.

This monograph is another of the valuable contributions from the Shaw School of Botany, and exhibits the careful preparation and thoroughness that characterize the works of the author. *Leitneria Floridana*, Chapm., was discovered growing abundantly in the swamp lands of southeastern Missouri, by Mr. B. F. Bush, in November, 1892. Heretofore, it had only been reported

with certainty from Florida where first collected and described by Dr. Chapman. In the Missouri locality it was found in swamp lands which appear to be always under water and associated with plants known to be of a distinctly southern range. This discovery has suggested and supplied the material for the present valuable contribution.

The plant appears to propagate largely by sending out suckers which may account for the large preponderance of plants of one sex in each swamp. The habit appears to be arborescent rather than shrubby.

The tree is dioecious, and the flowers appear in the early spring, before the leaves, from buds developed during the preceding autumn. The staminate flowers are devoid of any perianth, and are in catkins 1 to 7 inches long. The pistillate ones are in short catkin-like clusters,  $\frac{1}{2}$  in. long, and possess a rudimentary perianth of a few small glandular fringed scales. The character of both anther and stigma bespeak wind pollination. The leaves are lanceolate to elliptical-lanceolate acute at both ends, narrowly revolute and petiolate. Stipules could not be seen nor even stipular scars discovered. One of the remarkable characters, is the exceeding lightness of the wood. That of the stem showing a density of 0.207, and of the root 0.151 water being unity, being lighter than the bark of *Quercus suber*, the density of which is 0.240, and which has been considered lighter than any wood of which a record can be found. The figures given for other light woods are *Ochroma lagopus*, 0.240, the East Indian "Dedoaf Tha" 0.260, and for indigenous trees the *Ficus aurea* of Florida, 0.2616, Tupelo (Nyssa) 0.519, white cedar 0.332, and the willows and poplars ranging between 0.363 and 0.607. The extreme lightness of the wood of *Leitneria* is due to its loose structure and softness of its tissues, which are easily compressible under the thumb-nail, and the absence of any heart wood.

A careful microscopic examination was made, and the anatomy is described in detail. The stem is peculiar for the presence of secretion passages accompanying the pith sheath. The entire absence of these secretion reservoirs, and of sieve-tubes and grit cells in the cortex is noteworthy. The medullary rays are usually only one or two cells in thickness. The periodic growth rings are evident only on examining the wood with a lens. The most striking feature of these rings is the production of a row of wood parenchyma cells replacing the libriform in the first series cut-off by the cambium, each spring in the beginning of the year's growth. The cortex is rich in tannin, likewise the epidermis of the leaf. The leaf structure shows immediately under the upper epidermis a layer of quadrate cells, each containing a large stellate crystal. The mesophyll is composed of 2 or 3 layers of compactly placed, rather short palisade cells and a spongy parenchyma with ample intercellular spaces below.

The pubescence is of two kinds—slender-pointed, thick-walled, occasionally binate hairs, usually with transverse septa especially toward the widened base, and less numerous clavate hairs septate both longitudinally and transversely, their small cells with yellow contents. The habit, morphology and histology of the plant are handsomely illustrated by 15 full-page plates, 8 of which are photomicrographs.

The views of the various systematists are explained. Bentham and Hooker considered this to be a monotypic genus, and entitled to ordinal rank under the name *Leitneria*, which decision is sustained by Engler (Engler and Prantl.



*Pflanzenfamilien*), who adopts the name *Leitneriaceæ*, and places it between *Myricaceæ* and *Salicaceæ*. Recent histological studies would indicate its close relationship to the polypetalous orders *Dipterocarpeæ* and *Hamamelideæ*.

The peculiar lightness and softness of the Missouri cork-wood and its slight porosity, suggest that it should find application in the arts. It may prove a useful substitute for cork in the manufacture of bottle stoppers for chloroform, and for gummy substances, which cause cork to tear badly after a little use.

G. M. B.

*Analyses of Twelve Thousand Prescriptions.* By William Martindale. London, 1894. H. K. Lewis. Pp. 504.

The anticipated revision of the British Pharmacopœia has induced Mr. Wm. Martindale, joint author of the *Extra Pharmacopœia*, to publish the results of "Analyses of Twelve Thousand Prescriptions," in the hope that they may serve to indicate the current of British medical practice during the past ten years. The prescriptions analyzed were the last dispensed antecedent to May 1, 1894, in six pharmacies in typical positions in the United Kingdom—2,000 at each centre—Aberdeen, Bournemouth, Carlisle, Cork, Oxford and London. The basis of the compilation was the index of the *Extra Pharmacopœia*, and official and unofficial drugs and preparations were noted.

The seven highest of the series were: Spirit of chloroform, 1,117 times; tincture of nux vomica, 991; glycerin, 875; sodium bicarbonate, 807; syrup of orange, 796; aromatic spirit of ammonia, 675, and quinine sulphate, 598. The lowest point touched in the official preparations was by extract of cannabis indica, ammoniated mercury and lemon juice, each of which occurred 30 times; 215 official articles and 84 unofficial were noted. Other than tests and those required for making official compounds, 126 official products were not once prescribed. Amongst these latter it is singular to our American eyes to note the presence of solution of magnesium citrate and solution of morphine sulphate. Solution of morphine acetate was prescribed 46 times; opium was called for 52 times; morphine acetate, 19 times; morphine hydrochlorate, 59 times, and the solution of the last named, 172 times. Whilst especial preference is shown for the hydrochlorate salt of morphine, the sulphate being but once dispensed, in the quinine salts the preference, by far, is for the sulphate; it being ordered 598 times as against 18 times for the hydrochlorate, 15 for the hydrobromate, 19 for the salicylate and 22 for the valerate.

The practice of reviewing prescription files has been followed in a number of cases in this country in the past, notably by Albert E. Ebert, of Chicago, who, in 1886, analyzed some 15,000 prescriptions; and it has a certain value in indicating the trend of medical practice. But, undue stress should not be laid upon the value of such tables. They are indicative only, in the largest and best sense, when they embrace returns from the prescription files, not of a few cities for a few months, but of *all* the prominent centres of population, for a term of years. It is obvious that the obtaining of such data would involve enormous labor, but it is seemingly the only way to obtain information that would be thoroughly representative of the medical practice of the whole country.

J. W. ENGLAND.

*Recipes for the Manufacture of Flavoring Extracts, Handkerchief Extracts, Toilet Water, Cologne, Bay Rum, etc.* By Charles E. Hires. Published by the Charles E. Hires Company, Philadelphia, 1894. Pp. 46.

The title fully indicates the scope of this publication, and many useful formulæ are given that cannot but be of value to the intelligent druggist who is accustomed to make his own preparations.

Some valuable information concerning vanilla is given in the introductory remarks, as the following quotation will show: "We have five varieties of vanilla beans—Mexican, Bourbon, Tahiti, South American and Wild Bean. Of these the Mexican is highest in price and value, then follow in order the Bourbon, the South American, the Tahiti and the Wild. Each of these has a distinct flavor peculiar to its species. The Mexican is worth on the market one-third more than the Bourbon, and the Bourbon, perhaps, one-third more than the Tahiti and South American.

"In vanilla beans we would advise the use of the Mexican variety only, though the Bourbon is sometimes used; the other varieties should never be used as a condiment, and we do not think they ever are, knowingly, but are used to a great extent to adulterate the Mexican in different ways; especially are they used to adulterate Mexican cut beans, which are used very largely by many manufacturers. The legitimate cut beans are made in Mexico. After the crop is cured and the perfect beans are selected for bundling, those having fungous growth, crooked and knotty, are cut up and shipped to this market as cut beans.

"The writer, through his intimate knowledge of the extent of the Mexican bean crop raised each year, has learned that in the United States alone there is sold as legitimate Mexican cuts and consumed, more than twice the total quantity of cut beans exported from Mexico."

Probably no one is prepared to speak on the subject of vanilla with more authority than Mr. Hires. He having personally inspected the vanilla plantations in Mexico. See this Journal, 1893, p. 571.

*Experiments with Sugar Beets.* By Harvey W. Wiley, with the collaboration of Dr. Walter Maxwell. U. S. Department of Agriculture, Division of Chemistry. Bulletin No. 39.

*Record of Experiments with Sorghum in 1893.* By Harvey W. Wiley, with the collaboration of Oma Carr and C. I. Hinman. U. S. Department of Agriculture, Division of Chemistry. Bulletin No. 40.

*Experimental Farms.*—Reports for 1893. By the Director, William Saunders. Ottawa, Canada, 1894. Pp. 351.

*Consular Report*, vol. 45, No. 164, May, 1894. Pp. 160.

An article on p. 70 of this report is of especial interest to pharmacists. It relates to Sicilian essential oils, by Charles M. Caughy, U. S. Consul at Messina. He sent a circular letter to every manufacturer and exporter of Messina, requesting information concerning manufacture, prices and detection of adulterations of essential oils. The replies embody information of considerable value.

*Transactions of the Academy of Science of St. Louis*, vol. 6, Nos. 12, 13, 14, 15 and 16. No. 13 is "A Study of the Relations of *Salix nigra* and *S. Amygdaloides*, together with the hybrids, arising from them as these species exhibit themselves in the vicinity of St. Louis. By N. M. Glatfelter, M.D. Issued April 17, 1894.

No. 16, by Charles Robertson, treats of "Flowers and Insects—Rosaceæ and Compositæ"—and was issued April 26, 1894.

*Manual of the Phanerogams and Pteridophytes of Western Texas.* By John M. Coulter. Contribution from the U. S. National Herbarium, vol. 2, No. 3. Published by authority of the Secretary of Agriculture.

*Non Nocere.* By A. Jacobi, M.D. An address delivered before the Eleventh International Congress at Rome, Italy, in its General Session of April 4, 1894.

## PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

### THE PENNSYLVANIA PHARMACEUTICAL ASSOCIATION.

The annual meeting of this association was held at the Neversink Mountain House, Reading, Pa., June 12 to 15, 1894.

The association was welcomed by ex-Mayor Merritt. The address of President McIntyre followed. In this he suggested a number of changes, the most notable of which was to have the nominations for officers made by a committee of seven, whereby, it was thought, a better selection might be made. This suggestion was adopted at a later session. The executive committee reported that 290 active members were on the roll.

The committee on legislation was requested to protest against the proposed increased tax on alcohol from ninety cents to one dollar and ten cents per gallon.

From the committee on trade interests it was learned that many druggists have refused to use alcohol which is supplied by the "Trust."

The committee on adulteration read a valuable report which elicited much discussion. The committee had at considerable labor and expense examined a large number of samples. Laudanum was found to be of better quality than formerly. Spices were found to be adulterated to at least fifty per cent. mostly with starch. Rock candy syrup, it was stated, contained considerable glucose, which tended to throw doubt on the claims of many manufacturers of this article, that it is made by dissolving rock candy in water.

The officers selected to act at the next annual meeting were: President, Wm. H. Reed, of Norristown; First Vice-President, John B. Raser, of Reading; Second Vice-President, C. N. Boyd, Butler; Treasurer, Joseph L. Lemberger, Lebanon; Secretary, J. A. Miller, Harrisburg; Executive Committee, A. R. Durham, W. S. Seabold, J. H. Knouse.

The next annual meeting will be held at Eagle's Mere, on or about June 18 1895. J. B. Duble was elected local Secretary for that occasion.

Mr. George M. Beringer, of Camden, N. J., was elected an honorary member. The social features of the occasion were well looked after by the Reading pharmacists, and every visitor enjoyed the real hospitality accorded by them.

A number of valuable papers were read in addition to those published elsewhere in this issue of the Journal.

Charles E. Hires delivered an interesting address, in which he advocated the system of having clerks to share in the gross receipts, as a part of their compensation.

Dr. William H. Reed read a paper on "Cutting Prices of Patent Medi-

cines." Andrew Blair answered the query, "Who shall be our Apprentices?" He also furnished some samples of official preparations, notably, Basham's mixture, solution of magnesium citrate and syrup of tolu, in which he attributed superiority of product to be due largely to first-class materials. In most cases, he claimed, the official formulas would yield a reliable and permanent preparation.

A. L. Beck presented a paper on commercial solution of ferric chloride. He found the variation of ferric chloride from the official requirement to be comparatively small; some contained too much free hydrochloric acid, and one showed an excess of nitric acid.

William B. Thompson read a paper on "The Drug Business To-day and Yesterday," and H. E. Peters one on Terebene.

H. N. Coxe recommended the preparation of mercurial ointment by the use of a mutton suet that had been carefully rendered and then preserved for six months wrapped in waxed paper; during this time it became white and granular, and would then extinguish the mercury in much less time.

#### MISSOURI PHARMACEUTICAL ASSOCIATION.

The sixteenth annual meeting of this association was held at Excelsior Springs, Mo., June 12 to 15, 1894, under the presidency of William Mittlebach. A number of interesting and valuable papers were read, one of which will be found on page 355 of this issue.

#### THE MINNESOTA PHARMACEUTICAL ASSOCIATION.

The tenth annual meeting of this association was held at the Hotel St. Louis, Lake Minnetonka, Minn., June 12 to 13, 1894.

The membership of this association was reported to be 226, an increase of 15 during the year.

In the discussion of trade interests, it was proposed for the protection of such interests, that a line of household remedies, to be sold by druggists largely in place of patent medicines, should be manufactured by the State Association.

This proposition caused a general discussion and one which waxed warm at times, but no actual decision in the matter was reached, although the burden of opinion seemed to favor the adoption of the scheme as proposed. As finally left, the president was asked to appoint a committee to prepare another report, such report to be presented at the next annual meeting. In connection with the subject of patent medicines further action was taken in the passage of a motion instructing the committee on legislation to prepare a bill to be sent to the legislature, requiring all peddlers of patent medicines to pay a license of \$100 per annum for the privilege.

The Secretary, Charles T. Heller, read a paper on "Elixir Phosphate of Iron, Quinine and Strychnine." A history of the Minnesota College of Pharmacy, by Dean Wulling, was also read.

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Mr. Heller's paper will appear in the August number of this Journal. It contains a practical formula for the rapid preparation of this elixir.



FIG. 1A.—Fruit of *Theobroma Cacao*. One-half natural size.

FIG. 1B.—Seed deprived of succulent outer coat and showing veiny middle one. *a*, chalaza; *b*, micropyle and hilum end. Natural size.

FIG. 1C.—Embryo deprived of its coverings, showing the irregularly creased cotyledons. *a*, one of the creases; *b*, projecting end of radicle. Natural size.

FIG. 1D.—Embryo with cotyledons separated and exposing their inner faces. *a*, *a*, the cotyledons; *b*, radicle; *c*, caulicle. Natural size.

FIG. 2.—Section of a portion of one of the cotyledons of *Ariba Cacao*, magnified 750 diameters. *a* and *g*, intercellular spaces; *b*, cell wall; *c*, a starch grain; *d*, fat crystals; *e*, nucleus of cell; *f*, granular protoplasm.

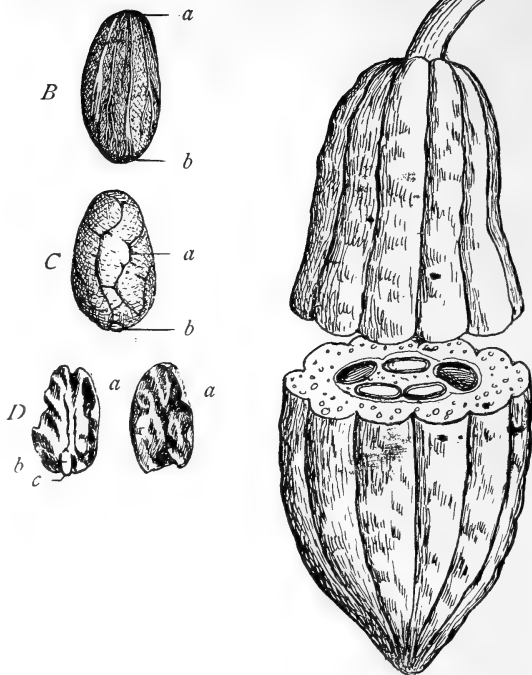


Fig. 1

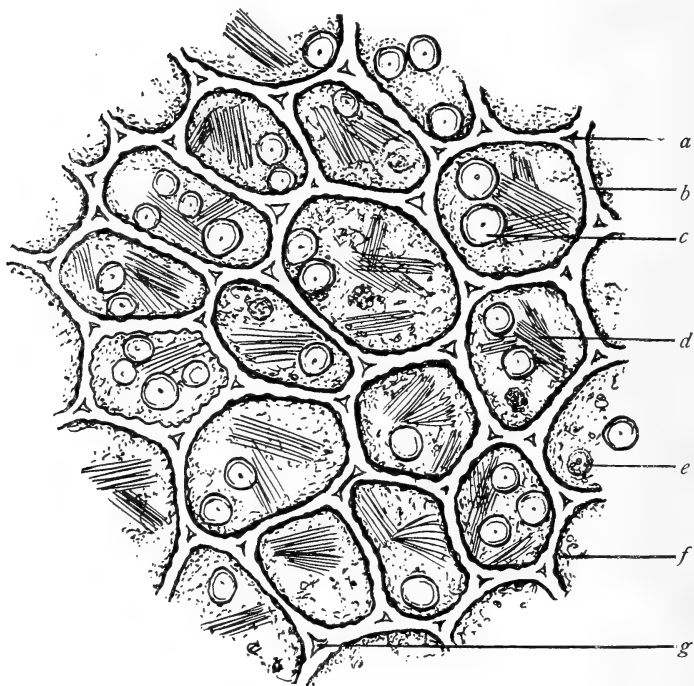


Fig. 2

# THE AMERICAN JOURNAL OF PHARMACY

AUGUST, 1894.



## STARCHES IN DIFFERENT COMMERCIAL VARIETIES OF CACAO.

BY EDSON S. BASTIN.

The genus *Theobroma*, of the natural order *Sterculiaceæ*, is a small one, consisting of nine or ten species, all of them natives of tropical America. The seeds of several of these are said to be more or less used in the countries in which they grow, but there seems to be no question that those which, under the name of Cacao, constitute such an extensive article of commerce, are almost wholly derived from *Theobroma Cacao* of Linnæus. This species is a native of Mexico, and probably also of the northern portions of South America, and it is extensively cultivated in Mexico, Central America, Peru, Ecuador, Brazil, New Granada, Venezuela, Guiana, and in most of the West India Islands. It has also been introduced and is successfully cultivated in Java and some other tropical countries of the Orient.

The plant is a small tree, attaining a height of from fifteen to twenty feet, with cylindrical, grayish stems and branches; large, petiolate, stipulate, oval-lanceolate or oblong-lanceolate pendant leaves; small pentamerous, complete flowers, which form few-flowered clusters, mostly on the larger branches. The fruits, which usually occur singly, present a striking appearance because not borne on the young twigs, as are most fruits, but on the sides of the main stem or older branches. They are large, pendant, berry-like fruits, eight or ten inches long, somewhat pear-shaped, pointed at the apex, distinctly ten-ribbed longitudinally, and more or less wrinkled or irregularly furrowed, in a transverse direction. They are yellow or

reddish when ripe. In the pulpy interior are five loculi which contain from twenty to forty or more seeds. One of the fruits is shown, sectioned transversely, in *Fig. 1A*.

The seeds are enveloped in a fleshy exterior coat, which, in preparing them for commerce, is usually removed. These seeds are three-fourths of an inch to an inch in length, somewhat compressed and irregularly ovate or ovate-oblong in form. The outer remaining coat is reddish-brown, with several conspicuous, branching veins

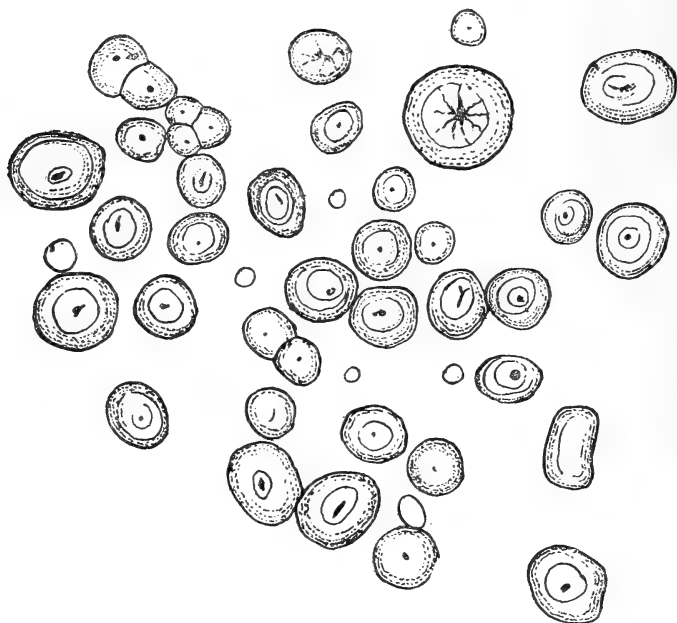


FIG. 3.—Starch from Ariba Cacao.  $\times 1500$ .

radiating from the chalaza, and running toward the hilum and micropylar end as shown in *Fig. 1B*. This coat is tough-papery in consistency, and when stripped off, exposes a very delicate inner coat, which is closely applied to the embryo and follows its convolutions. The seed is almost destitute of albumen, the latter being represented only by a small quantity of mucilaginous material in the folds and creases of the cotyledons.

The embryo, after the seed coats have been removed, is shown in *Fig. 1C*. Its thick, fleshy and somewhat unequal cotyledons are strongly creased and crumpled. The color varies greatly in different



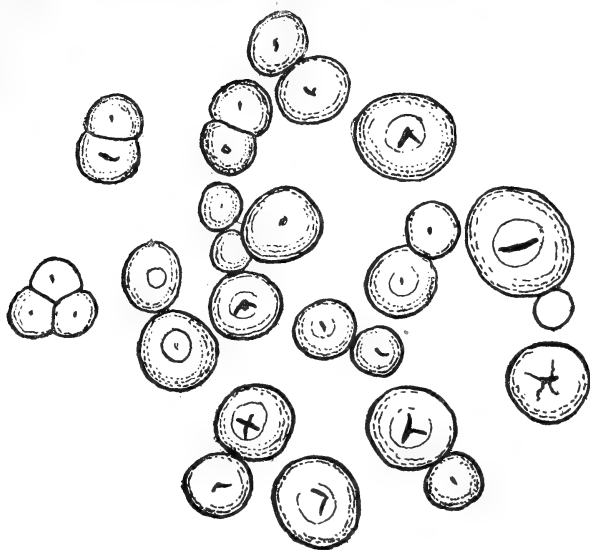


FIG. 4.—Starch from Tabasco Cacao.  $\times 1500$ .

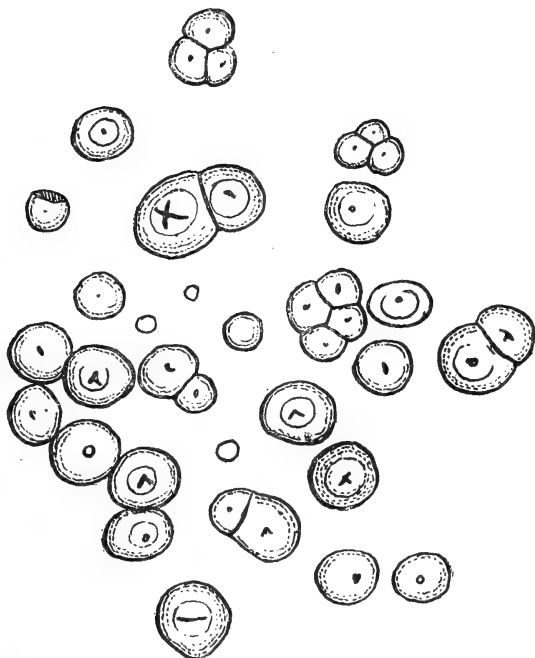


FIG. 5.—Starch from Surinam Cacao.  $\times 1500$ .

commercial specimens, from a light brown to a deep reddish-brown, depending probably on the degree of fermentation to which the seeds have been subjected in preparing them for the market. The embryo, with the cotyledons separated and exposing their inner faces, is shown in *Fig. 1D*.

The cacao tree has been under cultivation since before the discovery of America; how long before, of course, we do not know, and it is natural to expect that a plant so long under cultivation would now exist under a considerable number of cultivated varieties

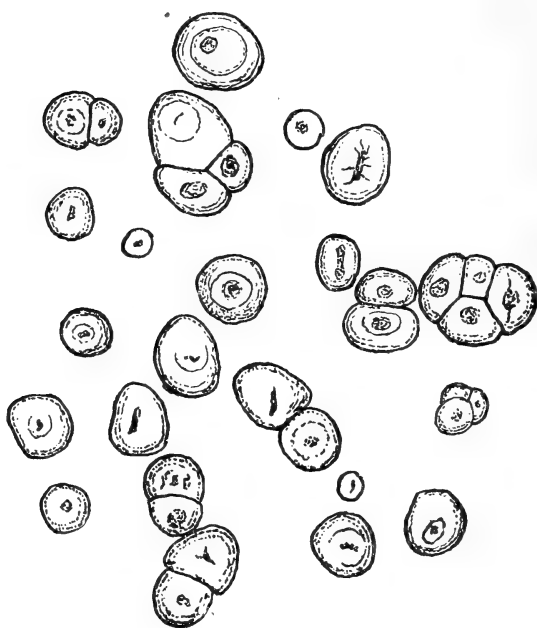


FIG. 6.—Starch from Bahia Cacao.  $\times 1500$ .

or forms. This is to some extent the fact, though the varieties do not appear so numerous or so marked as those of many other species that have been cultivated for so long a period. It is well known, though, that there are different grades of cacao seeds, some highly prized, others of inferior flavor. This depends, partly, no doubt, on the methods and care observed in curing, which differ in different localities, but also somewhat, probably, on soil and climate, and on those variations in the plant due to more obscure causes. Naturally, it is desirable to know whether it is possible to distinguish by

microscopic or other characters between the more desirable and the less desirable commercial varieties, and ten different samples were

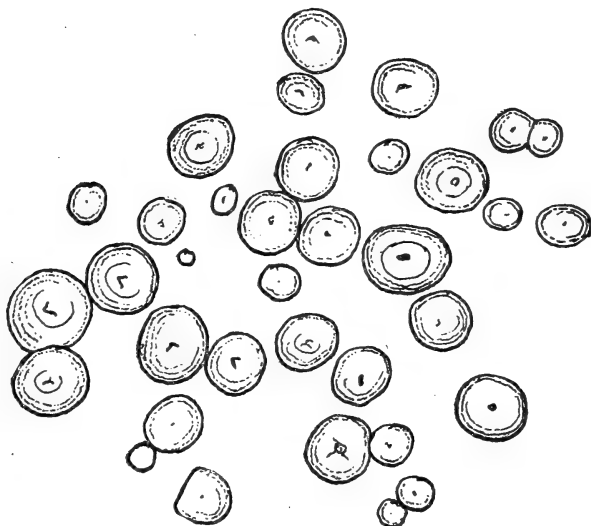


FIG. 7.—Starch from Machalle Cacao.  $\times 1500$ .

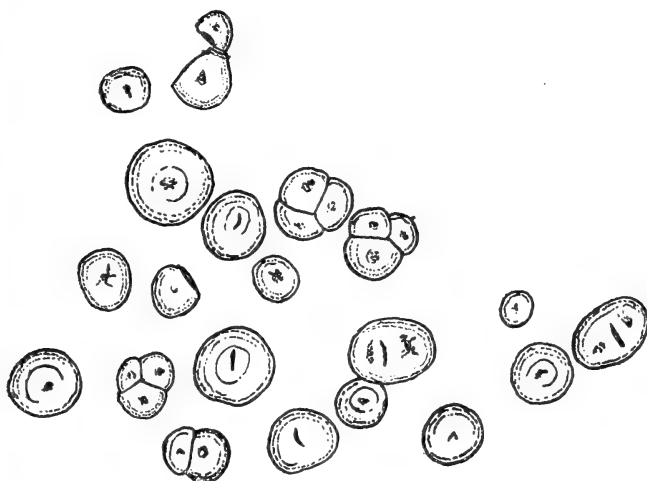


FIG. 8.—Starch from Grenada Cacao.  $\times 1500$ .

submitted to the writer, with the view of ascertaining whether there were any characteristic differences in the starches. To state the results of this study is the main object of this paper.

The following are the commercial varieties examined: Ariba, Caracas, Trinidad, Bahia, Surinam, Maracaybo, Machalle, Granada, Tabasco and Java.

Starch is rather abundant in cacao, on the average about 20 per cent., but unless the sections are very thin, it is difficult to recognize in the cells, owing to the abundance of fat (which, at ordinary temperatures, is in the crystalline form), granular proteids and brown coloring matters. Treatment with ether to dissolve out the fat renders the sections clear enough so that the grains are easily seen. A small portion of a thin section of one of the cotyledons of Ariba cacao is shown, magnified 750 diameters, in *Fig. 2*; *a* and *g* are intercellular spaces; *b*, cell-wall; *c*, starch grain; *d*, fat crystals; *e*, cell nucleus still visible in some cells; and *f*, granular protoplasm.

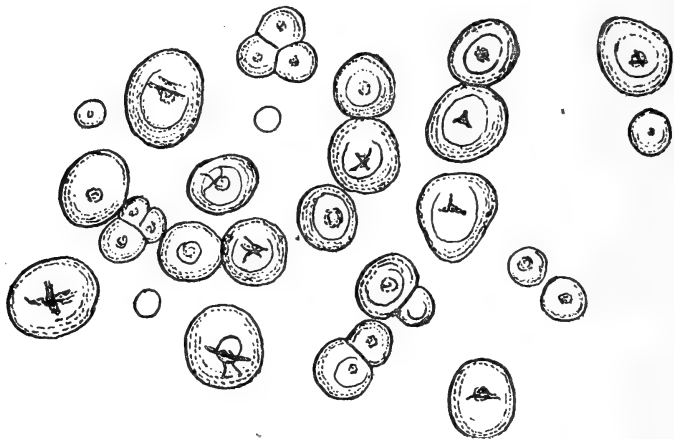


FIG. 9.—Starch from Trinidad Cacao.  $\times 1500$ .

Some differences were found, in the different samples, in the quantity of starch present. In the Machelle variety, for example, it was less abundant than in the rest; but, as many grains showed evidences of partial disintegration, there is reason to believe that this difference might have been due to the destruction of a part of the grains by excessive fermentation in the example studied.

In some other specimens, as in the Caracas variety, there appeared to be more than the average number of small-sized grains, but this, most likely, is not a constant difference, being probably due to the fact that the seeds were not quite mature when gathered.

The most conspicuous difference is that in some varieties the

compound grains were quite numerous, while in others they were relatively few. For example, in the Surinam, Bahia and Caracas

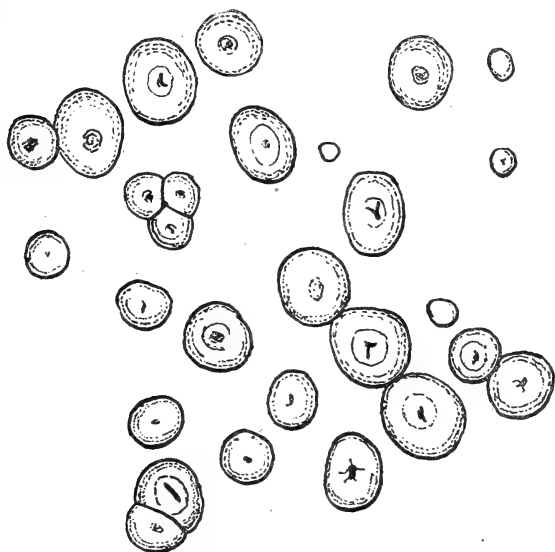


FIG. 10.—Starch from Maracaybo Cacao.  $\times 1500$ .

varieties they were very numerous, while in the Java, Tabasco and Ariba varieties, they were few. What the real significance of these

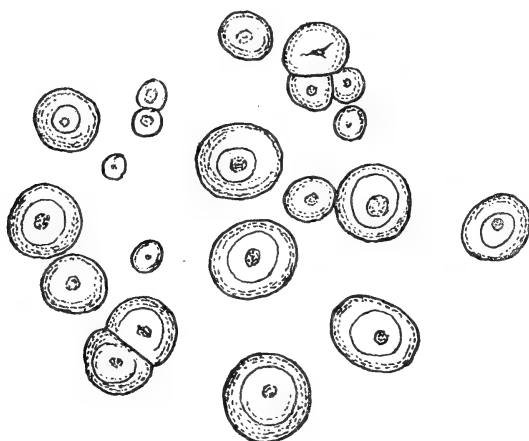


FIG. 11.—Starch from Java Cacao.  $\times 1500$ .

differences is, or what its value in distinguishing the different commercial varieties, could only be determined by the careful compari-

son of a very large number of samples. It seems to the writer very doubtful, indeed, if any differences sufficiently constant to be relied upon for diagnosis can be found between the starches.

The most important result of the investigation is rather the proof it affords of the essential likeness of the starches of the different varieties. Considering the long time the plant has been under cultivation, the widely separated sources of the samples, and the varied conditions under which they must have been produced, the likeness among the starches is surprising. This will be evident to anyone who gives the figures a careful study.

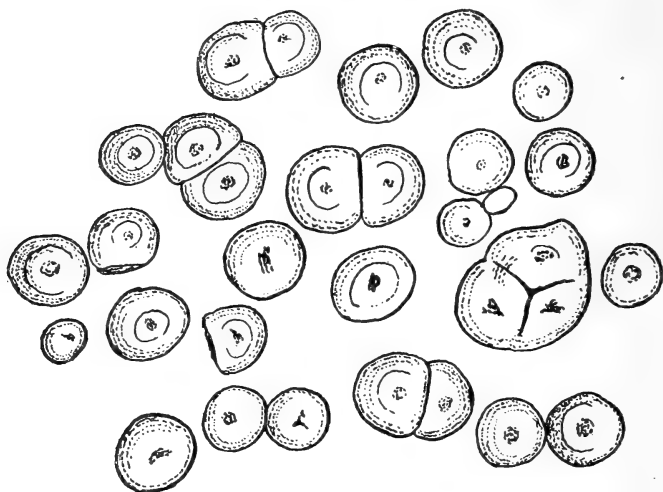


FIG. 12.—Starch from Caracas Cacao.  $\times 1500$ .

The starches may be described as follows: Grains spherical, or nearly so, when simple; hilum central, usually quite distinct and sometimes fissured; the fissure may be simple and straight or somewhat curved, angular or stellate; one, or sometimes two circular lines, usually quite distinct about the hilum, but the grains otherwise mostly unmarked and smooth; some of the grains compound, and these may be double, triple or even quadruple.

To those acquainted with the forms and structure of different starches, it will be evident from this description and from a study of the figures, that the starches of the cacaos, while resembling each other very closely, are yet quite unlike those of other drugs,

and could not, by the careful student, easily be confounded with them. It is very unusual for grains so minute to show a structure so distinct, particularly for the hilum and micropyle to stand out with such distinctness as they do in the cacao starches.

## INDIAN TANNING MATERIALS.\*

By DAVID HOOPER,

Quinologist to the Government of Madras.

	Per Cent. Tannin.		Per Cent. Tannin.
<i>Bridelia montana</i> , . . . . .	39·9	<i>Ficus indica</i> , . . . . .	10·9
<i>Acacia pycnantha</i> , . . . . .	33·8	<i>Mimusops hexandra</i> , . . . . .	10·3
<i>Acacia decurrens</i> , . . . . .	33·4	<i>Flueggia leucophlœa</i> , . . . . .	10·3
<i>Terminalia Chebula</i> (nuts), . . . . .	31·0	<i>Eugenia caryophyllifolia</i> , . . . . .	10·1
<i>Psidium Guyava</i> , . . . . .	27·4	<i>Mimosa pudica</i> , . . . . .	10·0
<i>Kandelia Rheedii</i> , . . . . .	27·4	<i>Cylista scariosa</i> , . . . . .	9·9
<i>Acacia Melanoxylon</i> , . . . . .	26·8	<i>Schlagera trijuga</i> , . . . . .	9·4
<i>Acacia leucophlœa</i> , . . . . .	20·8	<i>Odina Wodier</i> , . . . . .	9·1
<i>Woodfordia floribunda</i> , . . . . .	20·6	<i>Flueggia microcarpa</i> , . . . . .	8·9
<i>Acacia Arabica</i> , . . . . .	20·5	<i>Acacia pinnata</i> , . . . . .	8·8
<i>Cassia auriculata</i> , . . . . .	20·1	<i>Careya arborea</i> , . . . . .	8·7
<i>Rhodomirtus tomentosa</i> , . . . . .	19·5	<i>Hiptago Madablota</i> , . . . . .	8·5
<i>Macaranga Roxburgii</i> , . . . . .	18·4	<i>Eleodendron glaucum</i> , . . . . .	8·0
<i>Casuarina equisetifolia</i> , . . . . .	18·3	<i>Albizia Lebbeck</i> , . . . . .	7·4
<i>Cicca disticha</i> , . . . . .	18·1	<i>Potentilla Seschenaultii</i> (root), . . . . .	7·4
<i>Phyllanthus Emblica</i> , . . . . .	18·0	<i>Litsæa Zeylanica</i> , . . . . .	7·3
<i>Acacia dealbata</i> , . . . . .	17·8	<i>Terminalia glabra</i> , . . . . .	7·2
<i>Terminalia belerica</i> , . . . . .	17·4	<i>Mimusops Elengi</i> , . . . . .	6·8
<i>Bassia longifolia</i> , . . . . .	17·0	<i>Mallotus philippinensis</i> , . . . . .	6·5
<i>Mangifera indica</i> , . . . . .	16·7	<i>Cassia Roxburghii</i> , . . . . .	6·1
<i>Eugenia arnottiana</i> , . . . . .	16·1	<i>Thespesia populnea</i> , . . . . .	6·0
<i>Terminalia arjuna</i> , . . . . .	16·0	<i>Litsæa Wightiana</i> , . . . . .	5·8
<i>Anogeissus latifolia</i> , . . . . .	15·5	<i>Saraca indica</i> , . . . . .	5·7
<i>Diospyros embryopteris</i> , . . . . .	15·0	<i>Ficus gibbosa</i> , . . . . .	4·3
<i>Saxifraga ligulata</i> , . . . . .	14·2	<i>Cassia florida</i> , . . . . .	4·1
<i>Ficus racemosus</i> , . . . . .	14·1	<i>Terminalia tomentosa</i> (fruits), . . . . .	4·0
<i>Myrica Nagi</i> , . . . . .	13·7	<i>Ficus religiosa</i> , . . . . .	3·8
<i>Cassia Fistula</i> , . . . . .	12·9	<i>Acacia farnesiana</i> , . . . . .	2·8
<i>Diospyros</i> (fruits), . . . . .	12·4	<i>Lizyphus vulgaris</i> , . . . . .	2·8
<i>Eugenia Jambol</i> , . . . . .	12·4	<i>Rhamnus Wightii</i> , . . . . .	2·6
<i>Eugenia Jambolana</i> , . . . . .	12·0	<i>Ficus hispida</i> , . . . . .	2·1
<i>Eugenia montana</i> , . . . . .	11·9		

\* This list of tanning materials has been received from our honorary member at Ootacamund, India. It was compiled, and the percentages of tannin determined by him. The results have not appeared elsewhere, except in his report to the British Government. They are, therefore, considered especially desirable for placing on record in this country.—*Editor*.

## ELIXIR OF PHOSPHATE OF IRON, QUININE AND STRYCHNINE.—

BY CHARLES T. HELLER, PH.G.

Read before the Minnesota Pharmaceutical Association, June 12, 1894.

In reading the *Pharmaceutical Journals* of the last few years, one is struck with the frequency in which the editors are asked: What is the matter with this or that formula? In March last the *American Druggist* asked its readers, who had experimented with this elixir, to give a general account of the process they employed. Several answered the request, but in the writer's opinion the working of some of the formulas was too complicated, and others failed to be satisfactory in not mixing clear with water, making such an unsightly mixture that it nauseates the patient.

The formula which I have used for the past three years has always given entire satisfaction; the elixir is easily made, miscible with water, and cost twenty-eight cents per pint—but a few cents more per pint than that made from the sulphates. If time were counted in cost, my formula would be the cheaper. Each fluid drachm contains two grains phosphate of iron, one-half grain quinine and one hundredth of a grain of strychnine.

The formula is as follows:

Phosphate of Iron, U. S. P., . . . . .	256	grs.
Quinine (alkaloid), . . . . .	64	"
Strychnine, " . . . . .	1¼	"
Alcohol, . . . . .	2	fl. oz.
Water, . . . . .	2	"
Syrup, . . . . .	2	"
Aromatic Elixir, q. s. ad., . . . . .	16	"

Dissolve the phosphate of iron in the water, quinine and strychnine in the alcohol, mix the two solutions, shake, add the syrup and lastly the aromatic elixir. Set aside a short time, and filter if necessary.

There is one point in making the elixir I wish to call attention to; in adding the iron solution to the solution of the alkaloids, a thick curdy precipitate occurs; do not be alarmed at this, but continue as directed. Set the elixir aside and it will clear up in from a half hour to an hour.

I have made the elixir, when it has, for some unknown reason to me, taken three or four hours to clear, but the usual time is from one-half to one hour.

St. Paul, Minn., June, 1894.



## A REJOINDER ON SOLUTIONS.

*Editor of the AMERICAN JOURNAL OF PHARMACY.*

DEAR SIR:—In the July number of the AMERICAN JOURNAL OF PHARMACY I observe a note by Mr. Louis Kahlenberg, of the University of Wisconsin, criticising mildly the propriety of my paper on "Change of Volume when Liquids of Different Densities are Mixed."

Mr. Kahlenberg has either overlooked or failed to appreciate the very significant statement at the beginning of my paper, that "it has been known for some time that solutions of salts contract when diluted"—a fact of which I was fully aware at the time, since previous to writing that paper I had written a "Study of Solution," which was published in the March number (1893) of the *Pharmaceutical Review*, and subsequently copied into several of our pharmaceutical journals, which "study" was essentially a digest of the recent hypotheses of solutions as given in the English translation of Professor Ostwald's masterly work on "Solution." In this article note was also made of the thermal and optical properties of solutions, and full credit given to Professor Ostwald's publication.

But in order to further clear up the misapprehension which apparently exists over the purpose of that paper, kindly allow me to briefly state the circumstances which called it forth. At the visit of the American Pharmaceutical Association to Boston, in July, 1892, I became engaged in a friendly controversy with the professor of pharmacy in a sister college over the question whether contraction takes place when glycerin and water are mixed.

This discussion took place in the presence of a score or so of professors representing a number of colleges throughout our country, and by their interest in the discussion, and silence as regards the points involved, I inferred that the subject was new to them, and, therefore, that the fact as given by Professor Ostwald was not *well* known, at least to the pharmacists of America. On subsequently learning these facts through reading Professor Ostwald's book, in which I was very much interested, I was constrained to write and publish the "Study of Solution" for the purpose of calling the attention of our pharmacists to the newer theories of solution, and subsequently reinforced this by the paper on Contraction, the few isolated experiments of which were performed

solely for the purpose of demonstrating, in a measure, the *significance* of this *long-known*, but hitherto not *well-known*, fact to pharmacy.

Very truly yours,

WILBUR L. SCOVILLE.

BOSTON, MASS., July 13, 1894.

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## POTASSIUM IODIDE AND BROMIDE OF THE MARKET— DO THEY COME UP TO THE REQUIREMENTS OF THE PHARMACOPŒIA?

BY G. H. CHAS. KLIE.

Read before the Missouri Pharmaceutical Association, June, 1894.

### POTASSIUM IODIDE.

The Pharmacopœia gives the following tests for potassium iodide: Solubility of a given quantity of the salt in a given quantity of dilute alcohol, specific gravity 0.928.

A test for the alkali limit.

The salt must not contain sodium, iodate, sulphate, arsenic, lead, copper, nitrate or nitrite, iron, cyanide. The purity percentage, which is given as 99.5 per cent., is determined volumetrically.

Twelve samples of potassium iodide were purchased in the market. The intention was to examine the brands used in the United States only.

Except three, all samples were granulated. They were obtained from eight firms. From four, two samples each, and from four, one each, were obtained.

The granulated salt was chosen, because it is used most. As a rule, the granulated salt is not as pure as the crystallized. Crystallization will exclude many impurities which remain in the salt when granulated.

Sample No. 1 was not as soluble as the test demands; contained too much alkali. It also contained sodium sulphate, and did not show the purity percentage required.

Sample No. 2 contained an appreciable amount of sulphate, and did not come up to the standard of purity percentage.

No. 4 had an appreciable quantity of sulphate and ammonia, and could not be placed under the heading, standard, as to purity percentage.

No. 5 contained ammonia, and did not conform to the standard of purity percentage.

No. 6 was alkaline, contained sodium, freely of iodate and sulphate, and did not reach the purity percentage required.

No. 7 was all right in every respect, except that it did not conform to the test for purity percentage.

No. 9 contained traces of ammonia only.

No. 10 contained traces of ammonia, and did not reach the purity standard.

No. 11 showed traces of ammonia, and did not reach the purity standard.

No. 12 contained traces of sulphate, an appreciable amount of ammonia, and did not come up to the purity percentage required.

Samples 3 and 8 conformed to all requirements of the Pharmacopœia.

Next best was No. 9.

Sample No. 6 was the worst of the lot. It contained a considerable amount of iodate, which is a very dangerous contamination.

#### POTASSIUM BROMIDE.

The Pharmacopœia gives a large number of tests for potassium bromide. The main ones are as follows:

The salt should give a neutral or very slightly alkaline reaction.

The addition of chloroform and chlorine water to a solution of the salt should not develop a violet tint.

Potassium carbonate limit is given.

The salt must not contain sodium, bromate, iodine, iron and aluminium, arsenic, lead and copper, calcium, barium, sulphate, iron.

The absence of more than 3 per cent. of chloride is determined volumetrically.

Eight samples were obtained from seven firms. Of these, two samples were from one firm.

Sample No. 2 contained traces of sodium and sulphate.

Sample No. 3 showed traces of sodium, and did not reach the standard for absence of chloride.

Sample No. 4 was all right in every particular, except that it contained too much chloride.

Sample No. 5 showed traces of sodium and sulphate. It contained too much chloride.

No. 6. The only fault found in this sample was an appreciable amount of sulphate.

POTASSIUM IODIDE.	Solubility in Dilute Alcohol Sp. Gr. 0.928.	Alkali Limit.	Sodium.	Iodate.	Sulphate.	Ars'nic Lead, Copper	Nitrate, Nitrite.	Iron.	Cyan- ide.	Purity Per- centage.
Sample No. 1. . . .	Not complete.	Beyond.	Present.	None.	Appreciable.	None.	None.	None.	None.	Not standard.
" " 2. . . .	"	"	"	"	"	"	"	"	"	"
" " 3. . . .	"	"	None.	"	None.	"	"	"	"	Standard.
" " 4. . . .	"	"	"	"	Appreciable.	"	Appreciable.	"	"	Not standard.
" " 5. . . .	"	"	"	"	None.	"	"	"	"	"
" " 6. . . .	"	Beyond.	Present.	Large Amount.	Appreciable.	"	None.	"	"	"
" " 7. . . .	"	Within.	None.	None.	None.	"	"	"	"	"
" " 8. . . .	"	"	"	"	"	"	"	"	"	Standard.
" " 9. . . .	"	"	"	"	"	"	Traces.	"	"	Not standard.
" " 10. . . .	"	"	"	"	"	"	"	"	"	"
" " 11. . . .	"	"	"	"	"	"	"	"	"	"
" " 12. . . .	"	"	"	"	Traces.	"	Appreciable.	"	"	"

POTASSIUM BROMIDE.	Reaction.	Violet Tint.	Limit Po- tassium Carbon.	Sodium.	Bromate.	Iodine.	Iron Alumi- num.	Arsenic. Lead, Copper.	Calcium.	Barium.	Sulphate.	Iron.	Absence of more than 3 per cent. Chloride.
Sample No. 1	Neutral.	None.	Within.	None.	None.	None.	None.	None.	None.	None.	None.	None.	Standard.
" " 2.	Alkaline.	"	"	Traces.	"	"	"	"	"	"	Traces.	"	Not standard.
" " 3.	Neutral.	"	"	"	"	"	"	"	"	"	None.	"	"
" " 4.	"	"	"	None.	"	"	"	"	"	"	Traces.	"	"
" " 5.	"	"	"	Traces.	"	"	"	"	"	"	Appreciable.	"	Standard.
" " 6.	"	"	"	None.	"	"	"	"	"	"	Traces.	"	Not standard.
" " 7.	Alkaline.	"	"	Traces.	"	"	"	"	"	"	Traces.	"	"
" " 8.	Neutral.	"	"	None.	"	"	"	"	"	"	Traces.	"	"

Sample No. 7 showed traces of sodium and sulphate. It did not reach the standard as to chloride.

Sample No. 8 contained traces of sulphate and more chloride than the standard calls for.

Samples Nos. 3 and 6 met all requirements as to chloride.

Sample No. 1 conformed to all requirements of the Pharmacopœia.

Of the twelve samples of potassium iodide examined, two only, both from the same firm, met all pharmacopœial requirements. However, it should be mentioned here that these samples were of the crystallized salt. The firm makes no granulated potassium iodide.

Of the eight samples of potassium bromide, one only stood all the tests of the Pharmacopœia.

The answer, therefore, to the question: Potassium iodide and bromide of the market—do they conform to the requirements of the Pharmacopœia? must be answered: No! the large majority do not.

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#### CALCIUM PHOSPHOGLYCERATE.

This compound was discovered by Pelouze, who prepared the acid by acting on glycerin with anhydrous phosphoric acid. Recently Portes and Prunier (*Jour. de Pharm. et de Chim.*, [5] 29, 393) have prepared the acid by heating together 3 kilograms of 60 per cent. liquid phosphoric acid and 3.6 kilograms of pure glycerin, at 110° for six days. The mixture should be agitated three or four times a day. After two days it becomes colored and emits vapors. When completely cold the acid is saturated with a mixture consisting of 500 grams of calcium carbonate in 2 kilograms of water. The resulting product is allowed to stand for two or three hours, when saturation is completed by a further careful addition of calcium carbonate and water.

The solution is filtered, precipitated with alcohol, the precipitate collected by decantation and allowed to become air-dry; it is then dissolved in cold water, filtered, and the solution brought very carefully to dryness.

When thus obtained the salt is white, somewhat crystalline powder, soluble in fifteen parts of cold water, almost insoluble in boiling water, and insoluble in alcohol. The solution does not give the reaction of phosphoric acid when mixed with ammonium molybdate. The use of this salt has become established in some of the hospitals of Paris. Its especial value lies in its perfect neutrality and in the readiness with which it is assimilated.

## REPORT OF RESEARCH COMMITTEE B.

*To the Committee of Revision of U. S. P., 1890.*

NO. I.

BY DR. CHAS O. CURTMAN.

Read before the Missouri Pharmaceutical Association, June, 1894.

A number of experiments have been made for the purpose of ascertaining the conditions most favorable to the result of the test for arsenic by stannous chlorid (Bettendorf's test and its modifications).

The inquiry was directed to the following points :

- (1) The limit of sensitiveness of the test in its various modifications.
- (2) The best proportion of reagent to specimen.
- (3) The influence of the use of metallic tin together with the stannous chlorid.
- (4) The influence of the presence of other substances in the specimen tested.

## I. LIMIT OF SENSITIVENESS.

The following reagents were used :

(a) The solution directed for Bettendorf's test by the U. S. P., consisting of a saturated solution of pure stannous chlorid in pure concentrated hydrochloric acid. The specific gravity of this solution was = 1.467.

(b) Metallic tin, perfectly pure, in thin cylinders, from which shavings of about 0.1 gm. were taken as needed.

(c) Stannous chlorid solution prepared according to the German "Arzneibuch" by saturating a mixture of 5 parts of crystals of stannous chlorid and 1 part of hydrochloric acid with dry hydrochloric acid gas. The specific gravity was = 1.912.

All of the materials used were previously tested for absence of arsenic by Gutzeit's test, so as to exclude any fallacies arising from the introduction of even small traces of arsenic by the reagent, which might cumulate with those in the specimen.

It was easy enough to procure pure metallic tin, but impossible to obtain from local dealers, hydrochloric acid sufficiently free from arsenic to stand Gutzeit's test for one hour; so that I had to distill from purified sulphuric acid and pure sodium chlorid the hydrochloric acid required for the preparation of the reagents.

A number of specimens of arsenic solution were made, containing free trioxid, sodium metarsenite and sodium arsenate, in such proportion that each set corresponded exactly to an equal amount of As. They were: *Arsenic trioxid* ( $\text{As}_2\text{O}_3 = 197.68$ ), of which 1.31962 gm. contain 1 gm. of As.

*Sodium metarsenite* ( $\text{NaAsO}_2 = 128.82$ ), of which 1.7332 gm. contain 1 gm. of As.

*Sodium arsenate, U. S. P.* ( $\text{Na}_2\text{HAsO}_4 + 7 \text{H}_2\text{O} = 311.46$ ), of which 4.51834 gm. contain 1 gm. of As.

The solutions used for experiments contained from 0.5 gm. to 0.01 gm. of As.

Of these 1 cc. was used for each trial and the amount of reagent mixed with this varied from 1 cc. to 3 cc. so as to correspond with the limits prescribed in the pharmacopœial tests. When metallic tin was added to the reagent, 1 cc. each of the specimen and the stannous chlorid solution was used. In some cases of doubt a ten-fold quantity (10 : 30 cc., etc.) was used, to obtain sufficient material for colorimetric comparison.

A uniform application of heat was effected, whenever needed, by imbedding the series of test tubes under observation to an equal depth, into a sand-bath, heated to about  $80^\circ \text{C}$ .

Whenever comparisons of color became necessary to decide whether a deeper color had been produced than that of the unaffected reagent (as was especially necessary with the yellowish solution of the German Pharmacopœia), or whether a greater or less intensity of color characterized the reaction, narrow graduated cylinders, of 10 cc. capacity, were used in a dark box, with light reflected from beneath, or occasionally, for still greater accuracy, a pair of Hehner's colorimeter cylinders of 100 cc. capacity, also placed for observation into a dark box, admitting from beneath light reflected upward by a plate of milk glass, placed at an angle of  $45^\circ$ .

With the aid of these appliances the following results were obtained:

(a) With the U. S. P. solution of stannous chlorid, of specific gravity 1.467, 1 cc. of each of the three specimens, containing 0.5 mgm. of As was mixed in the different proportions stated below and kept at ordinary temperature for one hour.

With 1 cc. of reagent a sharp reaction had taken place at the end of the hour.

With 2 cc. of reagent the reaction was obtained earlier and was more intense at the end of one hour.

With 3 cc. of the reagent, the reaction was still more speedy, and at the end of the hour more intense.

No difference could be noticed either in time or in intensity between arsenic in the state of trioxid or pentoxid.

When the test tubes were arranged exactly as before, but placed in hot sand, the time was somewhat shortened, and a slight increase of intensity noticed in all of the specimens.

(b) When 1 cc. of the U. S. P. solution was used with 1 cc. of solutions containing 0.5 mgm. of As and a small piece of metallic tin added, and heat applied, the reaction was almost instantaneous, and in 3 minutes very sharp, unmistakable coloration appeared, which continued to increase in intensity for about 10 or 15 minutes, but was not notably darker at the end of the hour. No difference appeared in the different solutions containing arsenite or arsenate.

(c) When from 1 to 3 cc. of the stannous chlorid solution of the German pharmacopœia was used with 1 cc. of the solutions containing 0.5 mgm. of As, there was a slight darkening of the color in a few minutes, which continued to increase to the end of the hour. No difference was perceivable between the arsenious and the arsenic preparations. At 15 minutes, the specimens treated by U. S. P. solution and metallic tin showed a much greater intensity of color, but toward the end of the hour there was but little difference perceptible between the color of the specimens treated with 3 cc. of the German reagent, without heat, and that treated with 1 cc. of the U. S. P. reagent, metallic tin and heat. The specimens containing less than 2.5 cc. of reagent showed a less intense color.

These experiments were repeated with the three solutions containing 0.05 mgm. As in 1 cc. and resulted as follows:

(a) With the U. S. P. solution of  $\text{SnCl}_2$ :

1 cc. of reagent gave no reaction during 45 minutes; then gradual coloration began. If heat be applied the reaction begins in 18 minutes, and at the end of one hour is slightly more intense than when treated without heat.

1.5 cc. of reagent: reaction slightly more rapid and intense than with 1 cc.

2.0 cc. of reagent: still more rapid and intense, both with or without heating.



2.5 cc. of  $\text{SnCl}_2$ : reaction begins in 15 minutes at air temperature, in less than 5 minutes when heated.

3.0 cc. of  $\text{SnCl}_2$ : reaction slightly less intense than with 2.5 cc., both hot and cold.

3.5 cc. of reagent: a still further slight decrease in intensity.

No difference could be observed in the reaction of  $\text{As}_2\text{O}_3$  and  $\text{As}_2\text{O}_5$ ; the sodium metarsenite appeared to be very slightly more colored than  $\text{As}_2\text{O}_3$ .

(b) With 1 cc. of U. S. P. solution and a small piece of metallic tin, at a temperature of about  $80^\circ\text{C}$ ., 1 cc. of the solutions containing 0.05 mgm. of As began showing a brownish color at 13 minutes. At 35 minutes the reaction was quite sharp and continued to grow slowly in intensity to the end of the hour.

No difference was perceptible between  $\text{As}_2\text{O}_3$  and  $\text{As}_2\text{O}_5$ .

(c) 3 cc. of the solution of the "Arzneibuch," mixed with 1 cc. of the solutions containing 0.05 mgm. of As began showing a feeble reaction at 35 minutes, and at the end of the hour showed a plain reaction, as compared with the unchanged solution, but did not equal in intensity the reaction produced by the addition of metallic tin.

On repeating the experiments with solutions containing 0.03 mgm. of As in 1 cc. a feeble reaction resulted from the use of stannous chlorid and metallic tin at the end of an hour, but even after standing over night the other methods gave such a faint reaction that it required close inspection in the colorimeter to perceive the change. A solution containing 0.02 mgm. of arsenic failed to show any reaction. So I think that, *for practical purposes*, the utmost limit of reaction is reached at 0.03 mgm. of As in 1 cc., and that the method employing metallic tin and heat is to be preferred, where the presence of antimony or bismuth does not forbid its use. Even the addition of pure concentrated sulphuric acid, which was recommended when the test was first introduced, has not yielded to me any substantial advantage in detecting the presence of arsenic in the greater dilutions.

## 2. THE BEST PROPORTION OF REAGENT TO SPECIMEN.

In the foregoing experiments and a number of others conducted for that purpose, it was observed that both with the U. S. P. solution (without the use of metallic tin) and with that of the German

Pharmacopœia, the greatest intensity of color obtained after an hour's reaction occurred when 1 cc. of the arsenical solution was mixed with 2.5 cc. of the reagent. Between 3 cc. and 2 cc. of the German solution hardly any difference could be found; but with the pale U. S. P. solution a very slight difference appeared in favor of 2 cc. as against 3 cc. Heat did not appear to affect the proportion needed.

When metallic tin was added it seemed to be best to use equal volumes of specimen and reagent, although the variable amount of dark coatings of reduced arsenic adhering to the tin prevented an accurate comparison.

### 3. INFLUENCE OF THE USE OF METALLIC TIN TOGETHER WITH STANNOUS CHLORID.

When metallic tin is heated with pure concentrated hydrochloric acid, a copious evolution of hydrogen results. When heated with the saturated solution of stannous chlorid in hydrochloric acid, the evolution of hydrogen is but scant. When arsenic is mixed with the solution, the evolution of gas is perceptible, but very feeble. Very little arsin appears to be evolved, for a paper cap with a drop of acidulated silver nitrate does not show any evidence of reduction by  $\text{AsH}_3$  for over fifteen minutes, and even at the end of an hour but a very faint arsenic reaction is seen. To ascertain whether any of the arsin formed, would react with the stannous chlorid and thus hasten the reduction of As, I arranged a small apparatus in which a copious current of arsin, mixed with hydrogen, was generated and, after passing through a bottle filled with dry cotton, was permitted to bubble through stannous chlorid solution of the U. S. P. After more than an hour's time, not a trace of coloration could be detected.

So that after arsin has once been formed, it is not again decomposed by stannous chlorid. Hence the prompt action of metallic tin must depend upon the nascent hydrogen, which aids the stannous chlorid in reducing the trioxid and pentoxid.

But however satisfactory the action of metallic tin in accelerating and intensifying the reduction of arsenic, it cannot be employed to detect arsenic in preparations of bismuth or antimony; for the metallic tin reduces both of those metals and precipitates them from their solution as black flocculi which aggregate into small granular

lumps. There could be a distinction made between the firm flocculi of Sb or Bi and the finely divided brown particles of arsenic, but it would hardly be safe to trust to this appearance for a sufficient evidence of the presence of arsenic, and the preparations of Bi and Sb must be tested without the aid of metallic tin.

A number of specimens of pure bismuth and antimony salts were tested with the U. S. P. and the German solution of stannous chlorid in various proportions; but neither at ordinary temperature, nor when heated, did the least coloring occur.

#### 4. INFLUENCE OF THE PRESENCE OF OTHER SUBSTANCES IN THE SPECIMEN TESTED.

The preceding experiments were made with a solution of either arsenic trioxid or sodium arsenite or arsenate in water, other substances being absent. But in testing various chemicals for traces of arsenic there are different conditions, as the arsenic forms only a very small portion of the mixture. In the U. S. P. the Bettendorf test is directed for 11 preparations: For hydrobromic, hydrochloric, phosphoric and sulphuric acid, 1 cc. of the acid is to be tested by mixing with 1 cc. of the reagent, adding a small piece of tinfoil and heating. In case of magnesium sulfate, 1 gm. of the dry substance is to be shaken with 3 cc. of the reagent, metallic tin is then to be added and an hour allowed for the appearance of the reaction; sodium phosphate and pyrophosphate are treated in like manner, but heat applied and 15 minutes' time given.

In the case of antimony and potassium tartrate, antimony oxid, bismuth subcarbonate and bismuth subnitrate, it was intended to test with stannous chlorid alone for an hour, but by an unfortunate misunderstanding of the transcriber, tinfoil was directed to be added, which will reduce Bi and Sn as well as As.

To find whether any of the chemicals directed to be tested by the stannous chlorid method could influence the detection of arsenic, specimens were prepared containing the pure chemicals, shown to be free from arsenic by other tests, and with these small portions of arsenic were mixed, and the tests compared with those in which arsenic was present in equal amount without admixture with the chemicals.

In no case could any difference in the intensity of the test be made out, nor were the differences in the time of the occurrence of

the coloration sufficiently great or regular to justify the assumption that the reaction was impeded or accelerated by the presence of other salts.

CHAS. O. CURTMAN,  
Chairman of Research Committee B.  
ST. LOUIS, MO., May 27, 1894.

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## PHARMACEUTICAL NOTES AND COMMENTS.

BY FRANCIS HEMM, PH.G.

Read before the Missouri Pharmaceutical Association, June, 1894.

### R. *Non Repetitur!*

Of late we have been receiving many prescriptions with the above order either printed or written at the bottom or margin of the prescription blank. That the physicians are in earnest in having this request, or rather command, respected by the prescriber, there is no doubt in my mind. It is therefore a timely question for this association to consider and declare its position upon same.

Heretofore we have had no definite understanding or regulation to guide us in the matter, and books of authority on prescriptions and dispensing, among them Wall's Prescription, take the stand that such command on the part of the prescriber is both useless and presumptuous, and is and always has been more honored in the breach than in the observance by pharmacists, because if one refuses to refill his patrons' prescriptions upon his request, he will not alone sacrifice his patronage, but will also fail to prevent refilling, as almost every one of his competitors would do so without compunction.

The privilege granted the patient to have prescriptions refilled at pleasure is undoubtedly abused, as we all know; for who of us has not been called upon by a patient to refill his prescription for rheumatism from six to a dozen times and in some instances possibly for his friends in the neighborhood who were similarly afflicted?

This I concede is an abuse and works an injustice to the prescriber.

Again, we are sometimes asked to refill prescriptions containing opiates, cocaine or other narcotics to which the system becomes habituated, and which in a short time might make the patient a

confirmed slave to their use. Without the knowledge and sanction of the doctor, it is wrong to refill this class of prescriptions.

At times powerful poisons are prescribed to meet individual and special requirements for the time being, which the physician does not desire continued and which might produce bad effects if taken by someone else. Such prescriptions ought not be refilled unless so ordered by the prescriber.

In a great number of instances we compound prescriptions of a harmless nature, containing remedies which the patient, especially the chronic, must take for some time. What ought to be our course in such case? I believe it right and have always respected the physician's request not to refill in any instance, but am I or my good colleague to stand by this principle alone and suffer our disgruntled patron to go elsewhere to be accommodated?

I think it is time that the two professions have a clear agreement on this point, and I should like to see this vexatious matter presented to the American Medical Association through the section on pharmacy for settlement; I believe it would make many doctors and pharmacists better friends.

#### *Linimentum Saponis.*

The new directions for making this preparation are not good, as the powdered soap does not readily enter into solution when instructions are followed.

It is best to digest the soap with the water as formerly ordered, until a translucent jelly results, then dissolve it in the alcoholic solution of camphor and oil rosemary. Taking eight grams of dried soap in fine powder in place of ten grams of fresh or moist soap in shavings for 100 grams of product, is an improvement, because it insures a uniform quantity of soap in solution and the amount usually remaining in solution at our average store-room temperatures. Soap in shavings as formerly directed varies very much in the amount of water which it contains, and therefore is not uniform.

#### *Sapo Mollis (Sapo Viridis, 1880).*

The 1890 U. S. Pharmacopœia directs soft soap to be made from linseed oil. The product is a soft yellowish-brown mass.

The 1880 Pharmacopœia did not specify which fixed oil was used to make it, but merely defined its properties and described its color as a greenish-yellow.

Olive oil, hempseed oil, rapeseed oil, linseed oil, etc., have been variously employed in making green soft soap.

So far our dermatologists have not taken kindly to the new soap and generally prefer the olive oil soap. This applies also to the linimentum saponis mollis (*Tinctura Saponis Viridis*, 1880).

The title *Sapo Viridis* is a queer one for a yellowish-brown soap.

#### *Linimentum Ammoniae.*

Here we have another liniment with the formula slightly modified by the addition of about 5 per cent. of alcohol, but cottonseed oil is still retained.

My experience with this preparation is that when made with olive oil it is a much finer preparation and is generally preferred by the people and doctors.

I would therefore like to see olive oil substituted again for cottonseed oil.

#### *Spiritus Aetheris Nitrosi.*

The new formula, in which sodium nitrite is used and being dissolved in water is mixed with deodorized alcohol in a flask and decomposed with sulphuric acid, yields a fine preparation. The addition of the acid through the funnel tube must be slowly and gradually performed, as the reaction is a violent one.

Distillation goes on without the need of additional heat, as sufficient is generated by the chemical reaction to distill the ethyl nitrite.

The direction, to dissolve the 770 grams of sodium nitrate in 1,000 cc. of water is erroneous, as it requires 1.5 parts of water at 15° C. to dissolve it, or about 1,155 cc.

The method of purifying the distillate with ice-cold water, sodium carbonate and dried potassium carbonate to remove alcohol, acid and water, is a valuable improvement.

The whole process is so easily carried out that every pharmacist ought to find it a pleasure to prepare his spirit of nitrous ether.

#### *Hydrargyrum Cum Creta.*

The old formula which directed ether and alcohol for extinguishing the mercury in a mixture of prepared chalk and sugar of milk proved impracticable in the hands of the retail pharmacist.

The new directs to shake the mercury with honey and a little water for ten hours, or until the mercury is invisible under a lens

magnifying four diameters (it is stated that the shaking can be best done by mechanical means).

This no doubt is true.

It is finally to be mixed with the prepared chalk, brought to a creamy mixture with water in a mortar, until thoroughly extinguished, then dried and powdered without trituration.

This process was submitted last winter to my laboratory (senior) class and proved a failure even after careful and hard work and repeated attempts. It may be possible to make it work by mechanical contrivances on a large scale, but is certainly not well adapted to the wants of the retail pharmacist.

An improvement is needed.

#### *Liquor Magnesii Citratis.*

The formula generally is good, but why use 120 cc. of syrup of citric acid to a bottle? This is too much and must be too sweet for most people. 60 cc. has always been considered very palatable.

#### *Mangani Dioxidum.*

Attention has been drawn to the fact that when this chemical compound is prescribed, the dispenser should be particular to employ only the purified substance.

The commercial powder usually contains about 66 per cent. of the dioxide, while the pure is claimed to contain 90 per cent., and has the objectionable contaminations removed.

The pharmacopœial article is the commercial, but the purified substance is furnished by the manufacturing chemists at, of course, a much higher price, but well worth the difference from the standpoint of the careful prescriptionist.

#### *Collodium Cantharidatum.*

The official process directs to exhaust the drug in No. 60 powder with chloroform by percolation (in a percolator for volatile menstrua), recovering the chloroform by distillation and dissolving remaining 15 grams of oily extract in 85 grams of flexible collodion.

I prefer and have for some time used the following method. It somewhat accelerates and cheapens the product:

Exhaust the powdered flies with ether in same kind of percolator as already mentioned, distill off ether from percolate until reduced to 70 parts; add 3 parts of pyroxylin, 5 parts Canada turpentine, 3

parts of castor oil and 19 parts of alcohol; shake until dissolved and set aside to clear up. The German Pharmacopœia directs ether as the menstruum, but makes its cantharidal collodion 100 per cent. strong, quite a difference from ours, which is only 60 per cent.

For general use a 60 per cent. preparation gives satisfactory results, but veterinarians whom I have furnished both 60 and 100 per cent. collodions for their practice, report decidedly best results with the 100 per cent. They also prefer it made thicker than the official preparation.

It has been suggested to make this preparation by dissolving cantharidin in the proportion of 4 grains to 1,000 grains in flexible collodion.

A formula of this kind would simplify matters and would insure more uniformity of action.

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## ANTOINE-LAURENT LAVOISIER.

BY WILLIAM B. THOMPSON.

The close of the last and the dawn of the present century point to important epochs in the history of the science of chemistry. The mark of a period lies in the history of its scientific men. These are the centres and sources from which spring development and intellectual progress, and it is truly well for us to gauge the measure of our gain in a faithful retrospect of the life-work of those who have wrought out to demonstration, truths which time and experience expand into the fulness of knowledge.

The mysticism of alchemy had long been laid aside for the light of a truer wisdom—advancing civilization aroused and demanded a spirit of inquiry—speculation yielded to investigation—a flame had been kindled—diligence and patience brought their votaries to the task, and the roll of fame is honored in its inscriptions—Black, Cavendish, Priestley, Scheele, Lavoisier, each of which adds lustre to the sun of human achievement. The fame of these lies in our keeping, and what they have given to the store of knowledge is in part our heritage, of which we should show ourselves to be worthy—worthy in the respect which shall ever be paid to honored memories, and in the homage of future generations at the shrine of science.

The more fully the histories of these illustrious men become comprehended, the more eager will be posterity to accord the fullest



measure of justice to their individual worth, and to the incalculable advantages their discoveries have imparted to human life and to human happiness. Our present memoir has, however, particular reference to Lavoisier—Antoine-Laurent Lavoisier—the centenary of whose tragic death has just lapsed, and just been recorded. Corrupted tribunal and the fury of a Parisian mob consigned him and twenty-seven of his associates to death at the guillotine, in one day, in May, 1794. Thus died, at the age of 51, one who was conspicuously ardent and enthusiastic in the pursuit of knowledge, noble and aspiring in all desires and purposes, devoting an active life to humane and unselfish pursuit. The political situation of France at this time was deplorable in the extreme—recklessness and profligacy ruled the hour. Lavoisier's fatal blunder lay in his acceptance of a political position. The faults with which he was charged were those of his associates, not his. His personal record was above reproach, yet innocence was sacrificed to appease the rancor of jealousy and hate; and in order to show the vindictive spirit which prevailed, Coffinhal, who presided at the trial, is said to have exclaimed, when a plea for Lavoisier was offered, "France has no need for men of science!" The deep darkness of ignorance had not been dispelled a hundred years ago. There were many reasons why France should have exulted in the fame of her philosopher, Lavoisier. At the zenith his name became a word of national fame. Yet, passion and fury held such sway over the minds of evil-disposed men, that it required but the momentary descent of the glittering axe to strike off a head that not even a hundred years will suffice to replace with an equal. The ignominy of death detracts not—the name of Lavoisier will ever remain dominant in the chemical world of the last century. This man rendered inestimable service to his country and to mankind. He was guided and governed by an intelligent philanthropy. He was distinguished as an academician and an economist. He devoted a high order of talent to agricultural chemistry, and gave to his countrymen a knowledge to be practically applied in the cultivation and fruition of the soil. Lavoisier was born on the 26th of August, 1743, at Paris, the same decade of years which ushered in his eminent contemporaries, Priestley and Scheele. His preceptors were Abbe LaCaille in mathematics, Bernard de Jussieu in botany, and Guettard in geology and mineralogy—a trio distinguished in science. Lavoisier's first manuscript essay (1765) was upon the subject of calcium sulphate, or gypsum.

This was chiefly noteworthy in giving for the first time an explanation of the "setting" or hardening of plaster of paris; also noting the chemical alteration in an over-burnt product. The following year he was awarded a medal by the "Academie des Sciences" for the merit of a plan for illuminating large towns. He became a candidate for election to the august body of the Academy, and on the 18th of May, 1768, gained the privilege of a seat on the rear bench. This was in the thick of the dark and stormy days of the Revolution. Yet, amid profoundly disturbing causes, Lavoisier found time to pursue his themes, and during his twenty-five years of connection with the Academy he contributed over two hundred reports upon various and miscellaneous subjects. These covered a wide range in science and natural philosophy. His varied positions of public life and trust, and more especially during his term as *Fermier-generale* (a State organization controlling the financial system) he became deeply interested in the condition of the peasantry of France, in their agricultural employments and interests. He drew up exhaustive treatises on the cultivation of flax, of the potato, and of the liming of wheat. He established working plans for experimental farms, where methods in cultivation could be demonstrated as well as taught, established depots for the collection of agricultural implements, and codes for the more equal adjustment of tithes and taxes and rentals; also rights in pasturage. The economic condition of Agriculture in France at this time had become extremely wretched—impoverishment everywhere. Farmers had but few beasts; the winter food of cattle was unprovided in many districts; fields were unfertilized; the yield of corn was not greater than five times the weight of the seed. Lavoisier sought, patriotically, through his knowledge, to remedy these distressing evils. He introduced the cultivation of the beet and the potato; he improved and increased the breed of sheep and of cows. Under this wise foresight and philanthropic effort each succeeding year marked a change for the better in the lot of the peasant. In 1793 the crop of wheat had doubled; the number of beasts had increased five-fold. Yet, withal, in the following year, Lavoisier died the death of ignominy at the hands of those whom he had spent his life in befriending and benefiting—wicked, monstrous ingratitude! He was made a victim of popular prejudice, and was an unfortunate citizen of a crumbling, rotten and hopelessly fallen dynasty. Lavoisier was the author of

savings and discount banks, workhouses, insurance societies, establishments for the tutoring of nurses, plans for the formation of canals, and for exploiting the mineral resources of the province.

Thus is presented a history of a brief life, yet that of one thoroughly imbued with the ardor of his nationality—a man of intense zeal and large philanthropic purpose. The gifts of his mind were generously and bountifully given for the benefit of his race. His varied knowledge had no selfish application. He appears to have pursued and investigated truth for the sake of truth. His life is a lesson for the studious. In philosophy and science there is no brighter or more illustrious exemplar than Lavoisier. Let his name be forever honored and revered!

PHILADELPHIA, June 29, 1894.

## THE TECHNICAL MANUFACTURE OF COCAINE FROM ITS ACCOMPANYING ALKALOIDS.

ALFRED EINHORN AND RICHARD WILLSTÄTTER.

Translated from the *Berichte der deutschen chemischen Gesellschaft*, 27, 1523.

BY FRANK X. MOERK.

The manufacture of cocaine from the alkaloids accompanying it is technically effected, as has been known for some years, by boiling these alkaloids with concentrated hydrochloric acid, which results in decomposing them into ecgonine and acids belonging to the aromatic series; from the ecgonine the cocaine can readily be obtained by synthetic reactions. This partial synthesis of cocaine is accomplished by one of two methods: 1. The ecgonine is *benzoylated*, i. e., converted into benzoyl-ecgonine and this is then *esterized* with methyl-alcohol yielding *cocaine*, the methyl-ether of benzoyl-ecgonine, or more simply benzoyl-methyl ecgonine. 2. The ecgonine can first be esterized forming methyl-ecgonine, and this can then be benzoylated.

The alkaloids occurring with cocaine, which have been obtained in a pure condition, and which are derivatives of ecgonine, like isotropylcocaine and cinnamylcocaine, have been proven to be derivatives of methyl-ecgonine and the aromatic acids; it was therefore reasonable to suppose that other alkaloids which have not as yet been isolated would also be found to be derivatives of methyl-ecgonine. With this supposition the problem was imposed

of preparing methyl-ecgonine directly in the decomposition of these alkaloids, thereby simplifying the technical manufacture of cocaine from this source.

We have found that this problem is easily solved if the alkaloids be boiled for several hours with sulphuric or hydrochloric acid in the presence of methyl-alcohol; this gives conditions under which methyl-ecgonine is not decomposed, but, on the contrary, tends to be easily produced or formed.

Fifty gm. of the cocaine accompanying alkaloids are boiled on a water-bath for three to four hours (using, of course, a reflux condenser) with 300 gm. methyl-alcohol and 100 gm. pure sulphuric acid; after distilling off the alcohol, the syrupy residue is poured into water (the quantity of this, however, must not be excessive), the aromatic acids, but more especially their esters (methyl-esters), which are precipitated are removed, and the acid solution extracted with chloroform; the acid solution is next saturated with potassium carbonate, and the methyl-ecgonine, which separates as an oily layer, extracted with chloroform.

The same results are obtained when dry hydrochloric acid gas is passed into the methyl-alcohol solution of the alkaloids until the solution, which at first becomes warm, again becomes cold; the solution is then boiled for two hours, using a reflux condenser, and the methyl-ecgonin isolated as just described. The ester, methyl-ecgonine, was obtained in almost theoretical quantity; it was purified by conversion into the hydrochlorate which, recrystallized from alcohol, had the melting point, as stated by Einhorn and Klein, of  $212^{\circ}$  C. Distilled in a vacuum, methyl-ecgonine gives in the main a distillate free from decomposition products, boiling at  $177^{\circ}$  C., under a pressure of 15 mm.

If in the process as described ethyl-alcohol be substituted for the methyl-alcohol, there results ethyl-ecgonine instead of methyl-ecgonine. A similar observation was made by Einhorn and Konek de Norwall when in heating dextro-methyl-ecgonine in an ethyl-alcoholic solution of ammonia in a sealed tube to  $100^{\circ}$  C., they found that there was produced dextro-ethyl-ecgonine. We can add that cocaine can be quantitatively converted into its higher homologue, cocethyline, by boiling for two hours an ethyl-alcohol solution of cocaine which has been saturated with hydrochloric acid gas.

## THE CULTIVATION OF GINSENG.

BY THE EDITOR.

Considerable inquiry and report relating to the cultivation of this drug has recently been printed in agricultural journals. As various branches of the drug trade are expected to act as distributors of this commodity, the following information, which appears to come from headquarters, may be of interest.

A correspondent of the *American Cultivator* in New York writes as follows :

I have recently taken up the roots from three beds 3 x 16 feet each, which had been in cultivation, one five years, the others four each. The combined product of the three beds was 1,074 roots, which weighed 73¼ pounds. From these I assorted out 833 roots, weighing 20¾ pounds, for transplanting again, leaving 52¾ pounds of clean washed roots to be dried for market. These will make about 17 pounds when dry, worth \$3 to \$3.50 per pound. The seed produced from the plants during the time was worth at least \$40. It will be observed that the stock had been decreased only 241 roots. The beds were set with small, wild roots four or five years ago. The roots originally set were much smaller than those taken off for resetting. Two hundred and thirty-three seedlings, three seasons' growth, weighed 3¼ pounds. I have at this time in my garden 32 beds, 3 x 16, stocked with roots and seeds, only one bed more than three years old. Have over 30,000 seeds in forest culture. It looks to me as though this was a paying business and worthy the attention of gardeners.

*American Gardening* furnishes the following information, which can easily be verified by anyone who may feel doubt about it :

### WHAT GROWERS IN THE BUSINESS HAVE TO SAY ABOUT IT.

In recent years there has been much inquiry about ginseng culture and its possibilities. People in our hilly sections have for years been engaged in digging the wild ginseng (*Aralia quinquefolia*). They had no trouble to find a market for the dried root at paying prices, the demand of the Chinese people for the product, on account of its great but mysterious medicinal properties, being usually larger than the supply. The diggers of the plant, well aware of the great commercial value of the root, have often attempted to transplant the root to their gardens, or to start plants from seed, but have uniformly made a failure of it, either because the plant defies the cultivator's skill, or because no such skill has been brought to the task. We believe that the latter is the case, and that the plant can be made to thrive under cultivation, if the same conditions are provided under which the plant thrives in its wild state.

Evidently the seed is slow to germinate and the root of slow growth. We have feared that this growth was indeed too slow to make the culture of the plant profitable. Recently, however, we have the reports of a few persons who have made a success of ginseng growing. As most of these persons hesitate to give information on the subject, for fear of drawing a considerable number of

people into the business, thus flooding the market and spoiling prices, it seems that after all there may be good money in the culture of the root.

The following are communications received from ginseng growers in reply to our direct inquiries :

#### GINSENG GROWING IN KENTUCKY.

Ginseng seed will germinate in six months if proper conditions exist. Two years' growth makes a good salable root. Of course, two or three years' additional growth would make them much larger. I have roots grown direct from the "seed" that are from one half to one inch in diameter, and from five to twelve inches in length, tapering to a small fibre at second year's growth. On an average five to seven roots will weigh one ounce when dried. Ginseng thrives best in moist, fertile soil, in woods where it is lightly shaded. It must have light and air. My nursery is located on a rich, north hillside. The soil is of limestone nature. Timber was walnut, beech, ash, poplar, oak, hickory, dogwood, etc. A rich north-west and north-east slope is good. So is flat land, if not swampy, and in fact any rich, moist, fertile soil. I have a trial bed in open land. Will give it artificial shade. I used virgin soil, humus and leaf mould from the forest to bed with.

The best roots are grown direct from the seed. The quickest and best way to get a start is to plant roots that bear or produce seed. If seeds are planted, they will not produce any seed until the second year, and not many then ; but if roots are planted they produce seed first year, and plenty of them if old enough. I have a lot of old roots, taken from the forest and transplanted to my nursery. These I keep to produce seed. Some of them produce from 75 to 100 berries, or from 150 to 200 seeds ; some as low as three berries or six seeds. A berry contains one, two, three and sometimes four seeds.

In the fall of 1891 I planted, or transplanted, a bed of roots one year old, cultivated them two years, then I dug them. They weighed all the way from one to two pounds, dry, per 100 roots ; average size, one inch in diameter and ten inches long, tapering to a fine fibre. Last year I transplanted one root (eleven years old) taken from the forest. It was nine inches in circumference, fifteen inches long, and weighed nine and three-quarter ounces. This root, if dried, would weigh about three ounces, and would bring 75 cents at \$4 per pound.

Somerset, Ky.

J. W. SEARS.

#### FROM A NEW YORK GINSENG FARM.

I am aware that very many efforts to cultivate ginseng have proved failures. This is no evidence that the plant cannot be grown.

Ginseng seed requires eighteen months to germinate. It should not be allowed to get dry, but must be sown as soon as ripe, or may be packed in moist loam, and kept in condition to promote germination one year, and then sown.

Anything in the shape of a ginseng root is salable, but the larger the root the greater its value.

The plant can be grown in any light, rich soil. We find it wild in all kinds of dry soil, but it needs shade, either natural or artificial. We can successfully cultivate it in garden, orchard or forest. My own operations thus far with transplanted roots have been in open garden with artificial shade. From my own experience in this business, I am satisfied that it will pay to cultivate

ginseng, for the commercial value of the root, at \$2 per pound. The greatest value of the seed at present is in putting it in the ground to get roots from it.

If one works only for self-interest, it is too much to work up a demand for ginseng seed to make any money out of it.

I have the addresses of four parties in this country who are cultivating the root successfully, but fear to say anything about it lest other people engage in it. I have tried to get in correspondence with them for interchange of experience, but they are "mum."

I know of but one cultivator other than myself who has tried to bring this matter before the public. He has recently written me that the only way he expects to make any money out of the business is by growing the root for the general market (in China).

My grounds are open to all who wish to investigate. I am in the business to stay, so long as I have health to carry it on, and am willing to aid in its development.

GEO. STANTON.

Summit Station, N. Y.

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## RECENT CONTRIBUTIONS TO PHARMACY.

### PERU BALSAM.

*Peru Balsam.*—The numerous conflicting statements in reference to the constituents of Peru balsam and the bark of Myroxylon Pereira led to the following chemical investigation of the balsam, especial attention being paid to the resin contained in the balsam and to the chemical and microscopical characteristics of the bark; for the latter purpose there was available about one kilo. of bark from cultivated trees of Myroxylon Pereira, which bark was brought by Professor Tschirch from the botanical gardens in Buitenzorg, Java:

The previous investigators generally used strong alkalis to separate the oil from the resin dissolved in it; to obviate a possible saponification by this method, the balsam was treated with solvents. One kilo. of commercial Peru balsam, which by careful examinations was proven to be pure, was agitated with eight parts carbon disulphide, the solution decanted and the black residue frequently digested on a water-bath with fresh portions of the solvent; the solutions were united, the solvent recovered by distillation, and the residue taken up with ether, only a small quantity of a brown resin remaining insoluble. The ethereal solution was agitated with a  $\frac{1}{2}$  per cent. soda solution until it became neutral in reaction; upon separation and evaporation of the ethereal solution, a pale-brown aromatic liquid consisting of crude Peru Balsam oil (cinnamein) was

obtained, for the purification of which, solution in petroleum-ether had to be resorted to; the small quantity of resin which did not dissolve in this solvent was filtered out and the solution evaporated, when it left a pale-yellow colored liquid which was freed from the persistent odor of the petroleum-ether by repeated solution in ether and evaporation. Cinnameïn, the name given by previous investigators to this oil from Peru balsam, because it was considered to consist chiefly of benzyl-cinnamate, is present to the extent of 62-64 per cent. in the balsam; the physical properties and behavior towards reagents of this oil being well known, attention was directed to its composition. Dried over calcium chloride it was submitted to fractional distillation at ordinary pressure in a current of carbon dioxide; by applying heat very carefully the temperature rose steadily to nearly  $300^{\circ}$  C. without anything distilling over; (no indications of free benzyl-alcohol boiling at about  $200^{\circ}$  C. were obtained, although this has been claimed to be present); between  $298^{\circ}$ - $302^{\circ}$  C. almost the entire quantity distilled over, leaving only a small quantity of a tarry mass, which, upon cooling, became solid. The too rapid application of heat or an irregular current of carbon dioxide caused decomposition, producing discoloration and a very penetrating odor. This fraction, at about  $300^{\circ}$  C., was obtained almost colorless and without empyreumatic odor, had a slightly different odor from that of the material distilled, it now being honey-like; the reaction was slightly acid, due to traces of cinnamic acid, produced by a slight decomposition, and which was carried over in the distillation; by saponification with strong potash solution and extracting with ether, the latter solution left, upon distillation, a colorless liquid, boiling constantly at  $201^{\circ}$ - $202^{\circ}$  C., yielding benzaldehyde when heated with potassium permanganate solution, and only benzoic acid with chromic acid; these properties are characteristic of *benzyl alcohol*. The alkaline liquid, which was agitated with ether, was acidified with hydrochloric acid; the separated acid, decolorized with animal charcoal and recrystallized, melted at  $121^{\circ}$  C., and gave no test for cinnamic acid with potassium permanganate; therefore, only benzoic acid was present in the precipitated acid, and the chief constituent of cinnameïn is *benzyl-benzoate*. The small quantity of tarry residue left in the fractional distillation of cinnameïn saponified, and the products isolated yielded *benzyl-alcohol* and *cinnamic acid*, boiling constantly and entirely at  $202^{\circ}$  C. Cin



namyl-alcohol, resulting from the decomposition of styracin, and boiling at  $250^{\circ}\text{C.}$ , was not obtainable.

The resin, insoluble in carbon disulphide, was washed with carbon disulphide until all of the free acid was extracted, then it was digested with alcohol, which dissolved all but a very small quantity of a tarry substance; the alcoholic solution was evaporated, the resin dissolved in 2 per cent. soda solution, and the resin reprecipitated from this solution by a current of carbon dioxide; the resin obtained in this manner constituted a light-brown, flocculent powder, but precipitated by the use of hydrochloric acid, the resin formed large lumps, and, consequently, was much darker in color. Repeatedly redissolved in soda solution, reprecipitated by carbon dioxide and dried, this so-called *Peru-resin* formed a bulky, light-brown, slightly aromatic powder, easily soluble in alcohol, alkalies, glacial acetic acid, chloroform and acetone, insoluble in petroleum-ether, and only slightly soluble in ether; warmed with water, it cakes and melts at  $70^{\circ}\text{--}80^{\circ}\text{C.}$  to a brown, tenacious mass, which, upon cooling, can be kneaded and drawn into long threads of a chocolate color; boiled with water, the latter becomes acid to test-paper (although the alcoholic solution is neutral before boiling) and deposits small crystals of an acid character upon cooling, this behavior indicating the resin to be an *ester*. Experiment having demonstrated that the resin, by solution in 2 per cent. soda solution and reprecipitating with hydrochloric acid, is not saponified, the more expeditious method of Kraus for preparing the resin was followed: Peru-balsam was dissolved in a large quantity of ether (about 4 per cent. of a brown residue, changing on exposure to air into a black, pitch like mass, was disregarded; with potassium permanganate, this substance gave no indication of cinnamic acid, although the resin itself gave a very distinct test). The ethereal solution was agitated with a 2 per cent. soda solution, the resin passing into the alkaline solution, while the cinnamein remains dissolved in the ether; using a large quantity of ether, separation into two layers readily occurred; the alkaline solution, supersaturated with hydrochloric acid, separated the resin and the pre-existing free aromatic acids. By washing with warm water, the resin was freed from the aromatic acids, and then dissolved in 10–15 per cent. soda solution, and saponified by boiling for days; although the resin was precipitated every second day by hydrochloric acid, washed free from the liberated acid, and saponification

continued by use of a fresh soda solution, the complete saponification required from one to two weeks. In this prolonged treatment, two things were noticeable—the continued separation of a crystalline acid and the change in the resin, each precipitation causing it to be lighter-colored and less cakey, until after the completion of the saponification it formed a gritty powder, not melting even under boiling water, and failing, when heated in alkaline solution with potassium permanganate, to give the odor of benzaldehyde, this last reaction easily succeeding with the unsaponified resin. To determine the nature of the liberated aromatic acid, the separated acid and the washings by recrystallization were collected; the former, by its melting point,  $133^{\circ}$  C., combustion, and behavior towards potassium permanganate, was proven to be *cinnamic acid*; the washings, after being made alkaline, were concentrated and acidified, when another portion of the same acid was obtained, and from the mother liquor of this crystallization by repeated concentrations, was finally obtained a crop of crystals, not giving the cinnamic acid reaction, melting at  $121^{\circ}$  C., and by ultimate analysis agreeing with the formula of *benzoic acid*; the quantity of the latter acid was trifling, compared with that of the cinnamic acid. These results are analogous to those published by F. Lüdy on benzoin (Am. Journ. Pharm., 1893, 223 and 459); the tests described by him for the basic or alcoholic constituents (resinols) of benzoin, *benzo-resinol*, and *resinotannol*, were applied to the resinol from Peru-balsam, which can be prepared by a quicker method than the one described, namely, by dissolving the resin in strong soda solution, and heating for 2 to 3 days under pressure, when the saponification was found to be complete; the tests for benzo-resinol are, firstly, solubility in dilute potash solution and precipitation of the potassium compound by the addition of a concentrated solution of potash, amorphous at first, but by boiling becoming crystalline; secondly, the alcoholic solution of one part of the saponified resin, mixed with ten parts of freshly-prepared milk of lime, evaporated to dryness on a water-bath, powdered, boiled with alcohol, filtered, and the filtrate poured into water acidulated with hydrochloric acid, when a flocculent precipitate of benzo-resinol was obtained. Neither of these tests succeeded with the alcoholic body from Peru-resin; better results were obtained in trying the test for resinotannol, which consists in adding to the alcoholic solution an alcoholic solution of potash, when a brown precipitate is formed,

which, upon exposure to air, takes up water, becomes black, gradually deliquesces, and, by absorption of carbon dioxide, liberates again resinotannol; by repeating the solution and precipitation it was possible to almost quantitatively change the alcohol from Peru-balsam resin into its potassium compound; this compound is very soluble in water and is decomposable by addition of acids. The resinotannol from Peru-balsam in properties is similar to that from benzoin, but chiefly because of its different ultimate composition it is called Peru-resinotannol. Its properties, as far as they have not already been described, are: Light brown, bulky, odorless powder, neutral reaction, heavier than water, soluble in solutions of alkalies and alkaline carbonates, in acetone, glacial acetic acid and alcohol (water precipitates it again from the last two solvents); carbon disulphide takes up traces, and in petroleum-ether it is insoluble; assisted by moderate heat cinnaein dissolves it with a brown color; the addition of alcohol to this solution produces no precipitate, but the addition of ether does; it could not be crystallized from any of its solvents; concentrated sulphuric acid dissolves it with red-brown color; hydrochloric acid colors it black (a property also possessed by the oak-phlobaphenes); concentrated nitric acid oxidizes it to oxalic and picric acids; dilute nitric acid produces only picric acid. The following reactions point to its relations to the tannins: In alcoholic solution it produces with lead acetate a yellowish, with potassium bichromate a brownish-yellow precipitate, and with ferric chloride a red-brown precipitate, if water be added to the alcoholic solution until a turbidity is produced. This reaction with lead acetate was used in purifying the compound for analysis, the precipitate suspended in alcohol was decomposed by hydrogen sulphide, the filtrate diluted with water and acidified hydrochloric acid; the precipitated Peru-resinotannol was then obtained free from ash by repeated solution in ammonia and precipitation with hydrochloric acid; the ultimate analysis gave carbon 68.3 per cent.; hydrogen, 6.3 per cent.; oxygen, by difference, 25.4 per cent.; nitrogen was proven to be absent; the formula calculated from the analysis of the pure substance and a number of its derivatives is  $C_{18}H_{20}O_5$ . The following derivatives were also prepared and analyzed: *potassium derivative*,  $C_{18}H_{19}KO_5$ ; *acetyl derivative*,  $C_{18}H_{19}(C_2H_3O)_5$ ; *benzoyl derivative*,  $C_{18}H_{19}(C_7H_5O)_5$ . The *cinnamyl derivative* could not be obtained pure enough for analysis; neither could a crystallizable or uniform bromine product be obtained.

In addition to the cinnamein and the resin there was isolated by well-known procedure from the balsam a small quantity not exceeding 0.05 per cent. of *vanillin*; free *cinnamic acid* was found by agitating the balsam with portions of water at 40° C. until the last solution ceased to have an acid reaction, the mixed solutions made alkaline, concentrated and the acid precipitated by hydrochloric acid; although benzoic acid was looked for, it was not found even in the last crop of crystals.

In the examination of Peru-balsam the yield of cinnamein and resin should be about 64 to 30; should the figures differ considerably from these a separate examination by saponification of these two important constituents should be made to establish the adulteration.

The chemical examination of the bark of *Myroxylon Pereiræ* by treatment with different solvents gave no clue as to the constituent which, during the destructive distillation, produced the balsam; ether extracted from the bark which had a very pronounced odor recalling *coumarin*, only a very small quantity of a yellow resinous substance possessing the odor of the bark; in this extract neither *coumarin*, *cinnamic* nor *benzoic acid*, nor any of the balsam constituents were found; a small quantity of wax and a resinous substance entirely different from the balsam resin were all that could be identified. Alcohol extracted only about 0.7 per cent. of a brown resinous mass in which were found an easily decomposable iron-greening tannin, *phloroglucin* and a *phlobaphene*-like substance. The microscopical examination revealed secretion-cells only in the primary bark of young twigs; in the older twigs this primary bark is destroyed by the formation of corky tissue. Careful heating of the bark failed to show the formation of the balsam, which must be considered to be a pathological product. In consequence of the wounding of the tree an increased secretion follows, which then gives rise to the balsam upon heating; the increased secretion, judging from analogous cases and from the nature of the Peru-resinotannol is in all probability a tannin-like body.—(H. Trog. Arch. der Pharm., 1894, 70-98).

FRANK X. MOERK.

#### THE FLOWERING OF BLOODROOT.

John Chamberlain, in *Garden and Forest*, June 13, records his observations as follows: "I have been much interested this spring

in the development of some plants of the common Bloodroot (*Sanguinaria Canadensis*), which have become established in my yard. Early spring was unusually capricious, so that these plants by turns developed rapidly and shivered in the wind, or were buried in full bloom under the snow.

"The single, broad and deeply-lobed Bloodroot leaf, up to the time of flowering, is folded tightly around the flower stalk, and refuses to release it when the solitary white flower is ready to open, so that the prisoner has to force itself out.

"As the petals expand and the summit rises above the leaf-fold, they are obliged to beat the leaf down to make room for themselves, which they do in the course of an hour or so. It is soon found that an elongation of the flower-stem is also taking place, and the flower is soon carried entirely above the leaf, the stem making a growth of nearly two inches in the two hours that attend the opening of the flower. On the second day the leaf relaxes and expands, soon to be followed by other leaves from the root. If there is lacking any evidence of design in plant-growth, the mode of flowering of the Bloodroot ought to furnish it.

"There is another Bloodroot from North Carolina, in occasional cultivation here [Buffalo, New York], which differs considerably from our own, though scarcely distinguished from it by botanists. It has a leaf of similar shape, but of a steel-gray color when young; it flowers later and has a shorter flower stem, which does not appear to possess this power of elongation on the day of flowering. Bloodroot with pink flowers is occasionally found in this vicinity."

#### ESTIMATION AND SEPARATION OF THE CACAO ALKALOIDS.

This is effected according to Kunze by the following method: 10 gm. cacao are boiled for twenty minutes with 150 cc. of 5 per cent. dilute sulphuric acid, the mixture filtered, the residue washed, the alkaloids precipitated from the filtrate and washings by the addition of phospho-molybdic acid, allowed to stand for twenty-four hours, the precipitate collected, washed with 800-1000 cc. of dilute sulphuric acid, the filter with precipitate is placed in a beaker, covered with baryta water, carbon dioxide passed in to thoroughly precipitate the baryta, the mixture evaporated to dryness in a water-bath, the residue extracted with boiling chloroform and the solution evaporated, dried and weighed.

The alkaloids, almost pure white in color, are dissolved in ammonia and boiled almost to dryness with an excess of titrated silver nitrate solution of about 5 per cent. strength, the precipitate (a silver substitution compound of the formula  $C_7H_7AgN_4O_2$ ) collected, washed and the excess of  $AgNO_3$  estimated in the filtrate and washings with a standardized solution of potassium sulphocyanate; one molecule silver nitrate is the equivalent of one molecule theobromine, the quantity of total alkaloids less the ascertained quantity of theobromine equals the quantity of caffeine. Both alkaloids may be recovered and weighed as such; the filtrate and washings in which the excess of silver nitrate was determined are evaporated to dryness and the caffeine extracted with chloroform; the theobromine silver is dissolved in dilute nitric acid, the solution neutralized, evaporated to dryness and also extracted with chloroform.—(Ztschr. f. anal. Chemie) Apotheker Ztg., 1894, 67.

#### ASPHODEL ROOT AN ADULTERANT OF WHITE HELLEBORE.

Henry G. Greenish, (*Phar. Jour. Trans.* 53, 873,) has called attention to an adulterated bale of white hellebore recently received by a London firm from Genoa, and said to have been collected in northern Italy. The adulterant is a rhizome, about one and a-half inches in length and half an inch in thickness; it is erect, or nearly so, and often crowned with the brownish remains of smooth amplexicaul leaf bases, or sometimes with the fibres left after their decay. To this rhizome numerous roots, varying generally from three to six inches in length, are attached; near to the rhizome they exhibit a fusiform tuberous enlargement two to four inches long and three-eighths to three-fourths of an inch thick, tapering abruptly to about crow-quill size, and then assuming the shape of an Indian club. This fusiform enlargement of the root is sufficient to distinguish the root from white hellebore. The drug is certainly liliaceous. Many plants belonging to the natural order *Liliaceæ* are characterized by their swollen tuberous roots; the drug in question is probably derived from *Asphodelus albus*, Willd., a plant enjoying a wide distribution over Southern Europe.

As this drug is referred to by Galen both as a medicine and as a nutritious root used, in times of scarcity, as a food substitute by the peasants, its presence in white hellebore would necessarily reduce the value of the latter.

## EDITORIAL.

### ONE SUGGESTION FOR RELIEF.

In these days, when every week brings us some suggestion for the relief of the pharmacist, it is appropriate to inquire if these propositions have any real value, and if so, whether anything can be done to put them into practice. It must be confessed that many of them lack the one thing needful, namely, the power to apply them; this is especially the case with all of those which propose legal enactments as a means by which to attain the desired object.

During the months of May and June there were numerous meetings of State Pharmaceutical Associations. At these gatherings suggestions were made without number; each member appeared to have his favorite scheme for relief; some of these views were presented in the form of carefully prepared papers; others were forced on the members in the heated discussions which followed the reading of these papers; but it is safe to say that all were forgotten during the time given to "social features," which supplemented the weightier proceedings.

The members in the Missouri and Pennsylvania Associations found relief in written contributions bearing on this subject, while the members in the New York and a number of other associations vented their opinions without much apparent preliminary thought; these latter were in some cases none the less valuable for their spontaneity, as instanced by the remarks of one member in the New York Association, who advanced the idea that too many laws breed anarchy, and every new law creates a new anarchist. These remarks were not made in reference to laws for the so-called relief, but are they not applicable to many of the laws which have for their object the regulation of the drug business?

The above remarks may appear to be chiefly negative, and yet among all the suggestions, most of them from practical pharmacists, we should extract something of lasting value.

Possibly we have a plan presented in a paper before the Pennsylvania Association, and published in the July number of this journal, page 330, that may with profit be adopted. This contribution, by John F. Patton, referred to the National Formulary, and gave a brief history of this publication. The history furnishes valuable and interesting reading, but the remarks which follow are especially worthy of consideration. For instance, he says: "My experience and observation, in a limited way, lead me to the conclusion that the average physician is unfamiliar with this work (The National Formulary), and to a certain extent also, that of the United States Pharmacopœia. "This may account in a measure for his readiness to prescribe any new remedy offered, and his ready acceptance of the extravagant statements made in their praise we must attribute to human credulity." With this preliminary quotation we may pass rapidly on to the suggestion, although every statement of the author would bear repetition. "If the physician accepts the aid of the manufacturer in his practice, he would not refuse the efforts of the local pharmacist in that direction were they offered."

"Let us prove ourselves such competent pharmacists that there will be no question in the mind of any of our physicians as to our ability to prepare any remedy to meet any special case. We can best make our doctor patron ac-

quainted with the merits of the National Formulary by placing in his hands a copy of the work, and would it not be a good stroke of business to do so?"

This suggestion differs from almost all of its contemporaries by being practical, anyone can try it; in some cases, however, there may be a delicacy on the part of the pharmacist about presenting, and on the part of the physician about accepting, the book; cannot this, therefore, become the business of a local association, and thereby remove the personal element?

The National Formulary has already done much for the pharmacist, by removing the mystery which surrounds many of the long-titled syrups, elixirs, extracts, etc., and it can be made to do still more.

The paper on "Starches in Different Commercial Varieties of Cacao," which occupies first place in this number of the Journal, throws considerable light on a somewhat neglected subject. While the author inclines to the belief that we may not be able to distinguish the commercial varieties by the shape of the starch grains, yet it may be suggested that, with a knowledge of the character of these starch grains, the detection of foreign starches in the prepared and powdered cocoas will become comparatively easy.

This investigation has been made possible by the presentation to the College of a liberal collection of the commercial seeds, and it is the intention to have a chemical investigation supplement Professor Bastin's work.

## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Etude Monographique de la Famille des Globulariées au Point du Vue Botanique, Chimique et Therapeutique, par Le Dr. Edouard Heckel, Professeur à la Faculté des Sciences et à l'Ecole de Medicine, etc., avec la Collaboration de M. le Professeur Schlagdenhauffen, pour la Partie Chimique, et de M. le Dr. J. Mourson, Medicin principal de Marine, pour le Partie Therapeutique. G. Masson, Editeur. Paris, 120 Boulevard Saint-Germain. 1894.

The Globulariæ are a small family of plants mostly natives of the southwestern countries of Europe, but occurring in the Orient and in the Canary Islands. The family consists of a single genus, *Globularia*, containing, as usually reckoned, about a dozen species. It is one of those small groups of plants which have given systematists a good deal of trouble, *first*, to define their precise relationships to other families of the Gamopetalæ, the Brunoniaceæ, the Dipsaceæ, the Verbenaceæ, the Selaginæ, the Myoporineæ, the Compositæ and the Scrophulariaceæ, with all of which these plants have some notable characteristics in common; and *second*, in determining the number and limits of the species within the order. This number has at different times been now increased, now diminished and now again increased, according to the value which the investigator has placed upon certain structural differences.

This uncertainty in the classification is one of the reasons which urged Dr. Heckel to undertake anew the study of the group, being convinced that a thorough examination of the microscopic structure of the leaves and stems would throw the needed light on mooted points and establish not only the



systematic relationships of the group, but also determine the order of evolution and relationship of the species. Dr. Heckel has not only demonstrated what he set out to do, but he has shown in a most satisfactory way the great value of the study of the microscopic structure of the stem and foliar organs as means of determining systematic relationships. It would take up too much space to state here, in particular, all the interesting results achieved by this line of study, and so for these the reader is referred to the monograph itself.

Another incentive to the study of the group was a desire to ascertain the medicinal value of the species, some of them being quite extensively used as medicines by the French peasantry. He, therefore, associated with him in his work Prof. Schlagdenhauffen and Dr. Mourson, the former to make the necessary chemical, and the latter the therapeutic studies. Both seem to have done their work with thoroughness. The chemical work largely confirms and considerably extends that done by Walz in 1857. It proves that the principal constituent is globularin, a glucoside whose formula is  $C_{15}H_{20}O_8$ . This is readily decomposed by the action of acids into glucose, water, and a resinous body, globularetin, to which he assigns the formula  $C_9H_6O$ . Among the other principles present are cinnamic acid, manuite, small quantities of a peculiar tannin and coloring matters.

The species particularly investigated, were *Globularia Alypum*, L., *G. vulgaris*, L., and *G. nana*, Lam. These were chosen because they were species growing under widely different conditions, and it was desirable to note the influence of external conditions, such as latitude, altitude, amount of sunshine, etc., on the medicinal constituents.

It was found that the species studied agreed closely in their chemical constitution and the conclusion is drawn that environment has much less influence than some other causes in determining the chemical constitution. It is further concluded that probably all the different species of the family are endowed with similar medicinal properties.

Some of the conclusions reached by the therapeutic studies are as follows :

(1) *Globularin* is an antipyretic; it first depresses and then augments arterial tension; it acts directly upon the heart, slowing its pulsations; it increases the appetite and increases the peristaltic action of the intestines; it is a cerebral excitant similar in its effects to caffeine; it decreases the quantity of extractive matter in the urine.

(2) *Globularetin* is purgative and diuretic, increasing the quantity of solids excreted in the urine.

(3) The volatile principle (essence) is diuretic-stimulant.

The monograph covers about two hundred pages, contains five well-executed plates, besides illustrations in the text, and is altogether a creditable piece of scientific investigation.

EDSON S. BASTIN.

*A Text-book of Medical and Pharmaceutical Chemistry*, by Elias H. Bartley, B.S., M.D. Third edition, revised and enlarged. P. Blakiston, Son & Co. Philadelphia. 1894.

This work, which first appeared in the fall of 1885, has now reached a third edition and is much enlarged and improved. It covers very fully the ground usually gone over in the lectures on chemistry in the medical schools. Some features which seem to merit especial mention in looking through it are the

full and satisfactory account of the methods of sanitary water analysis on page 124, followed by a brief statement of the biological examination of the same on page 243, the full section on theoretical chemistry on page 77, and the large space devoted to the subject of physiological and clinical chemistry on pages 509-624. Some few errors have crept in it in connection with the use of proper names. Thus Berthelet on page 99 should be Berthollet; Victor Meyers on page 298 should be Victor Meyer; Barford on page 351 should be Barfoed.

Under essential oils we find no mention of pinene, sylvestrene and the fundamental hydrocarbons of what used to be called terpenes. The bringing in of the essential oils, camphors, resins and gums before any mention is made of the aromatic hydrocarbons, is also in our opinion an ill-advised arrangement. Indeed, the methane derivatives and the aromatic compounds are interspersed in a way somewhat confusing to the student. The book, however, contains much valuable matter in general well presented. It is very neatly finished and makes a convenient text-book.

S. P. S.

*Bulletin Vol. II, No. 1, College of Agriculture, Imperial University of Japan.* This contains a valuable contribution by Dr. Oscar Loew, Professor of Agricultural Chemistry, on "The Energy of the Living Protoplasm," and one "On the Poisonous Action of Di-cyanogen," by O. Loew and M. Tsukamoto. The former of these papers is worthy of especial attention. After a chapter devoted to "Former views on the cause of the vital phenomena," and one on "Modern steps of progress," the author devotes a chapter to his own views on "Living Protoplasm and Chemical Lability." He states that "The name 'living albumen' should be discarded altogether, as it might lead to erroneous conceptions," and that the term "active proteids" much better expresses the meaning, because it includes the whole living matter of the cell.

He considers that these active proteids exist as "exceedingly labil compounds that can be easily converted into relatively stable ones."

Since his theory depends almost entirely on the existence of labil compounds instead of what is usually designated "living protoplasm," we can best understand it by the following explanation, by the author, of chemical lability: "A labil position exists, if, in a molecule, one atom is influenced simultaneously by the affinities of two neighboring atoms.

"Thus lively oscillations are produced, bringing on a great ability for reactions, and an inclination for a spontaneous migration of the labil atom into a stable position." As aldehydes are highly labil compounds, the author believes they occupy an important position in the formation of active protoplasm.

*An Illustrated Dictionary of Medicine, Biology and Allied Sciences.* Including the Pronunciation, Accentuation, Derivation and Definition of the Terms used in Medicine and the Allied Sciences. By George M. Gould, A.M., M.D. Philadelphia. P. Blackiston, Son & Co. 1894. Pp. 1,635.

This book is not a revision or compilation of a previous work, but is entirely new. Its well-executed illustrations, its encyclopedic character, and its convenient size will at once establish it in the favor of every pharmacist and physician.

Most pharmaceutical and chemical terms are concisely defined in a way not found (if found at all) in the ordinary dictionary. The new synthetic remedies

receive sufficient attention to give one an idea of the chemical character, relationship and uses of each.

The changes have not been too radical, yet sufficient has been adopted to stamp the work as advancing in the progress of phonetic reform.

A number of special tables, which are carefully indexed, are a valuable feature of the work.

The mechanical part of the book is of a high order; the engravings are especially sharp and clear.

The whole is a credit to author, publisher and printer.

*Minnesota Botanical Studies.* Bulletin No. 9 Part III.

The following valuable contributions make up the contents of this number :

A revision of the Macroraceæ. By Roscoe Pound.

A revision of the Minnesota Grasses of the tribe of Hordeæ. By Francis Ramaley.

A preliminary list of the North American Species of Astragalus. By Edmund P. Sheldon.

*Eleventh Annual Report of the Board of Control of the State Agricultural Experiment Station at Amherst, Mass.*

*The Russian Thistle.* By Lyster Hoxie Dewey, U. S. Department of Agriculture. Division of Botany. Bulletin No. 15.

*Contributions of the U. S. National Herbarium.* Vol. III. No. 2. This consists of a paper by J. M. Coulter, on "Preliminary Revision of the North American Species of Cactus, Anhalonium and Lophophora." U. S. Department of Agriculture. Division of Botany.

*The Post-mortem Detection and Estimation of Strychnine.* By Alberton S. Cushman. Transactions of the Academy of Science of St. Louis. Vol. VI. No. 17.

*Proceedings of the Thirteenth Annual Meeting of the Alabama Pharmaceutical Association, held at Anniston, May 8 and 9, 1894.*

*Index-Catalogue of the Library of the Surgeon-General's Office United States Army.* Vol. XV. Washington: Government Printing Office. 1894.

*Les orchidées a coumarine le faham et ses Succédanés.* Par le Dr. Louis Planchon. 1892.

*Tableau des caractères des principales écorces de quinquinas Américains.* Par le Dr. Louis Planchon. 1894.

Both the above are reprints from *Nouveau Montpellier Medical.*

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## PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

### PHILADELPHIA COLLEGE OF PHARMACY.

The stated quarterly meeting of members of the College was held June 25, 1894, at 4 o'clock P. M. Robert Shoemaker presiding. Fifteen members present. Minutes of last stated meeting and of special meeting read and adopted. Minutes of Board of Trustees for April, May and June read, and, on motion, approved.

Report of delegates to the sessions of the Pennsylvania Pharmaceutical

Association, which met at Reading, June 12th, 13th and 14th, was presented by Dr. C. B. Lowe, a synopsis of which is as follows :

"The meeting was held at Reading, Pa., at the famed Neversink Mountain Hotel, overlooking the city 1,200 feet above sea-level; the effect of this altitude, commanding as it does a grand and imposing panoramic view of the landscape of the Schuylkill Valley, was most inspiring. The general attendance of members was above the average; the interest manifested in the proceedings and in the presentation of the various topics very marked. The social features and the plans perfected by the local committee—Messrs. Raser, Stein and Durham—representing the Reading druggists, were upon a most extended scale of liberality and generosity, every available moment being devoted to the pleasure of guests with an untiring assiduity and courtesy long to be remembered. The following officers were elected for the current year: President, Dr. W. H. Reed, Norristown; First Vice-President, John B. Raser, Reading; Second Vice-President, C. N. Boyd, Butler; Treasurer, Jos. L. Lemberger, Lebanon; Secretary, J. A. Miller, Harrisburg. The next meeting will be held at Eagles-Mere, Sullivan County.

On motion being made to elect delegates to the sessions of the American Pharmaceutical Association, to be held at Asheville, N. C., in September next, the following were nominated, and, on ballot being taken, were declared duly elected: Jos. P. Remington, William McIntyre, Edson S. Bastin, Geo. W. Kennedy, J. H. Redsecker.

On motion, meeting adjourned.

WILLIAM B. THOMPSON, *Secretary*.

#### AMERICAN PHARMACEUTICAL ASSOCIATION.

Information concerning the next meeting of this Association has been pretty widely distributed. We, however, take occasion to remind our readers that the meeting will take place at Asheville, N. C., Monday, September 3, 1894.

The committees in charge of the various sections have issued circulars requesting papers, in answer to queries submitted. Where none of the queries seem desirable, members are requested to furnish volunteer papers, choosing their own subjects. It may be said that all the queries submitted are worthy of attention by every member. Copies of these queries may be obtained by addressing the respective chairman of each section. These chairmen are:

Wiley Rogers, Chairman of Committee on Commercial Interests, Louisville, Ky.

L. E. Sayre, Chairman of Committee on Scientific Papers, Lawrence, Kan.

R. G. Eccles, Chairman of Committee on Pharmaceutical Education and Legislation, Brooklyn, N. Y.

The headquarters of the Association will be at the Battery Park Hotel, where a special rate of \$2.50 per day has been secured. Rooms may be procured in advance by addressing the local Secretary, W. G. Smith, Asheville, N. C.

The following provisional programme has been arranged by the local committee:

#### MONDAY, SEPTEMBER 3.

10 A.M. Council Meeting; 3 P.M. First General Session; 8.30 P.M. Reception.

#### TUESDAY, SEPTEMBER 4.

9 A.M. Second General Session; 3 P.M. Section on Commercial Interests; 8.30 P.M. Entertainment.

WEDNESDAY, SEPTEMBER 5.

9 A.M. Section on Scientific Papers ; 3 P.M. Carriage Drive ; 8.30 P.M. Section on Scientific Papers.

THURSDAY, SEPTEMBER 6.

9 A.M. Section on Education and Legislation ; 3 P.M. Section on Scientific Papers ; 8.30 P.M. Section on Commercial Interests.

FRIDAY, SEPTEMBER 7.

9 A.M. Section on Education and Legislation ; 1 P.M. Excursion to Hot Springs.

SATURDAY, SEPTEMBER 8.

9 A.M. Final Session of the Association.

NOTICE.

Mr. Thos. F. Main, Chairman of the Committee on Transportation of the American Pharmaceutical Association, has resigned, and the President, Edgar L. Patch, has appointed Mr. C. A. Mayo, of 37 College Place, New York City, his successor.

GEO. W. KENNEDY, *Secretary of Council.*

POTTSVILLE, PA., July 3, 1894.

THE MASSACHUSETTS PHARMACEUTICAL ASSOCIATION.

The thirteenth annual meeting of this Association was held 26th to 28th June, 1894, at Worcester, Mass. Over 125 new members were elected during the various sessions. The following officers were elected : President, Frank M. Harris ; Vice Presidents, H. F. Rockwell, C. F. Nixon and W. F. Sayer ; Secretary, M. L. H. Leavitt ; Treasurer, T. B. Nichols.

C. F. Nixon delivered "A talk on the Medicinal Plants Indigenous to Massachusetts." Papers were read by Prof. W. L. Scoville, on "Chalk Mixture ;" F. T. Drake, on "Alterations of Powdered Nux Vomica," and John T. Manning, "How to Keep an Index." The next meeting will be held in May, 1895, at Boston.

THE NEW YORK STATE PHARMACEUTICAL ASSOCIATION.

This Association held its sixteenth annual meeting at Saratoga Springs, June 26th to 28th, 1894. One of the features of the occasion was an address by Prof. H. H. Rusby, on "The Rubber Industry in South America."

The following officers were elected for the ensuing year : President, Charles F. Fish ; Vice-Presidents, I. C. Chapman, L. A. Baker, E. S. Gregory ; Secretary, Clay W. Holmes ; Treasurer, W. B. Fuller. Much time of the meeting was occupied with a discussion of the Pharmacy Law. The sentiment of the members was in favor of a "re-registration" amendment to the law now in force. Through the report of the committee, the Association was informed of a number of bills that had been brought before the State Legislature to regulate the practice of pharmacy, among them the perennial one of dispensing poisons in a special bottle ; this brought out a full discussion by members of the Association, and the almost universal sentiment was opposed to the adoption of any mechanical device. The meeting next year will be held at Oswego.

## ILLINOIS PHARMACEUTICAL ASSOCIATION.

This Association will hold its Fifteenth Annual Meeting at Peoria, August 14th to 16th. An elaborate programme has been arranged; the Retail Druggists' Association of Peoria will entertain the visitors on the evening of the 16th.

## INDIANA PHARMACEUTICAL ASSOCIATION.

The members of the I. P. A. met at Evansville, June 13th. The usual enthusiasm which has characterized this Association in the past prevailed to an unusual degree on this occasion. Several valuable and interesting reports were read, and Prof. Louis Diehl, of Louisville, Ky., addressed the meeting on the subject of the National Formulary. He outlined the history of this publication, and related how a plan had been devised by the Kentucky Pharmaceutical Association to make the use of the Formulary more popular among druggists of that State. This plan consisted in having members make preparations in strict accordance with the Formulary and present them at the meeting of the K. P. A.; these were to be examined by a committee and then presented and explained by this committee, at a meeting of the Kentucky Medical Association. The suggestion had been carried out to the letter, some 65 to 70 members having submitted samples. When presented at the meeting of the Medical Association, they attracted more attention than anything else on the programme.

Mr. Leo Eliel read a paper on the "New Pharmacopœia," and Prof. J. N. Hurty, one on "The Alcohol Molecule." The entertainment features were especially attractive. The Association will meet next year at Fort Wayne.

## INTERNATIONAL EXPOSITION OF HYGIENIC AND ALIMENTARY PRODUCTS AT ROME.

Next September 20th, will be opened at Rome the Ninth Exposition of hygienic and alimentary products, organized by the International Association for the improvement of hygiene, which has its seat at Brussels (Belgium), and counts among its members the scientific heads of the Old and New World.

Prof. H. E. Baccelli, Minister of Public Instruction, consented to accept the Presidency of the Committee of Patronage.

Interested parties can obtain a programme-regulation and all other information at the Secretary's office of the Association, 4, rue de la Linière, Brussels (South).

DR. W. DROIXHE, *President*,

DR. E. GILSON, *Secretary*.



# THE AMERICAN JOURNAL OF PHARMACY

SEPTEMBER, 1894.

## STRUCTURE OF PODOPHYLLUM. —

BY EDSON S. BASTIN.

The rhizomes of podophyllum grow horizontally or nearly so, but two or three inches beneath the surface of the ground, and in favorable soil, such as that of rich woods, may attain a length of a yard or more. Except for the swollen nodes that occur along them at intervals of from two to five inches, they are nearly cylindrical, and when well developed have the thickness of an ordinary lead pencil. The large nodes, however, may be twice as thick. From these, lateral branches are occasionally sent out, which resemble the parent rhizome, and also from their vicinity (mainly from the sides and lower surface) spring most of the roots with which the rhizomes are provided.

The rhizome increases in length by means of an axillary bud near its apex, and after it has attained a length of two or three feet, it decays at the base. By reason of this, each plant year by year is slowly travelling through the soil, and because the rhizome also branches, the one plant in the course of a few years becomes a colony of plants.

It is chiefly for this reason that we find the plants growing close together in patches, sometimes covering many square rods so densely with their foliage as to completely hide the ground.

Between the swollen nodes we have mentioned, occur the angular scars of bud-scales that have decayed as the rhizome developed, and about the large, circular scars found on the upper sides of the swol-

len nodes, we find a series of compactly arranged annular scars, which are also the scars of bud-scales.

The large circular scars just referred to, are of two kinds, one cup-shaped, and the other similar, except a central conical elevation, which is in reality a small bud. The former are the scars left by the decay of above-ground stems, the latter, scars of the large, radical leaves, of the previous seasons.

If the rhizomes have been collected in late autumn or in early spring, there will be found ascending from their apices and from those of their main branches, conspicuous terminal buds. A longitudinal section through some of these buds will show on the interior a stem with a pair of opposite leaves and a flower bud already

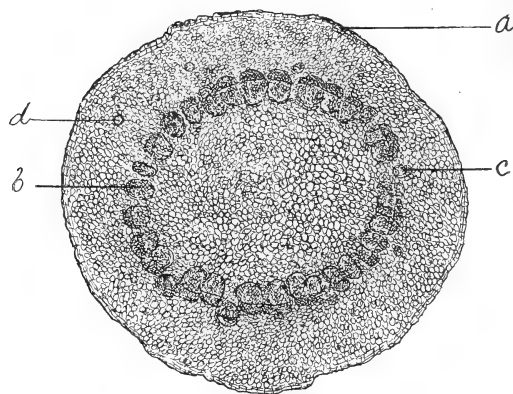


FIG. 1.

formed. Others, which have the same appearance exteriorly, contain only a radical leaf, but having its parts already well-developed and its peltate blade plicately folded down over the cylindrical petiole. A section will show at the base of this petiole a minute bud, over which in fact the petiole fits like a candle-extinguisher. When in the latter part of summer the leaf falls away, this bud appears as the conical elevation already alluded to, in the centre of the scar.

Besides this bud, the section will show another minute one on the lower surface of the rhizome in the axil of one of the bud-scales. This serves to continue the growth of the rhizome under ground while the leaves and stems are growing above ground.



Other small buds may also be found in the axils of some of the lateral scales, destined to give rise to rhizome branches.

The roots have a diameter when fresh of about one-sixteenth of an inch at their base, are four or five inches long, and branch rather sparingly near their origin, quite freely toward their apex.

A cross-section of the rhizome made at some point between the swollen nodes shows a large pith, a circle of wood bundles, the members of which are but little longer in the radial than in the tangential direction even in old rhizomes, a rather thick cortex consisting mostly of parenchyma, but with occasional small vasal bundles and a thin layer of not very well-developed collenchyma beneath the epidermis or the cork that has taken its place. The vasal bundles in

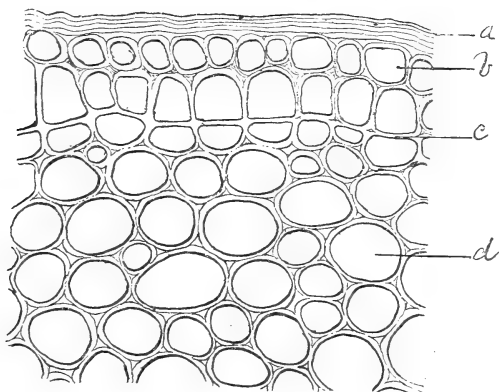


FIG. 2.

the circle are not equidistant. Some are quite isolated from the rest, being separated laterally from the adjacent ones by broad layers of parenchyma, while others are crowded together in twos, threes or fours, with very narrow layers of parenchyma between. Some also are quite large, others relatively small, and some, especially the smaller ones, are a little exterior to the main circle. The number of bundles may be as many as thirty-six; the average, perhaps, is not over twenty.

*Fig. 1* shows the transverse section of a rather large rhizome, magnified six diameters. *a* is the corky layer; *b*, one of the vasal bundles in the circle; *c*, a smaller bundle, slightly displaced from the principal circle; *d* is a small bundle in the cortex.

It should be remarked that the above-ground stem possesses a

structure quite different from that of the rhizome. The bundles, instead of being arranged in a circle, are scattered without apparent order through the stem as they are in the stems of monocotyls. This deviation from the dicotyl type is rather remarkable.

The cork cells of the rhizome are formed by the tangential division of the exterior layer of collenchyma cells, that is, of the one immediately underneath the epidermis. Only a few tiers of cork cells are formed, usually three or four, before the epidermis ruptures, and thereafter the thickness of cork does not increase, the scaling off at the surface keeping pace with the growth from within. *Fig. 2* shows a small portion of a cross-section of a rather young rhizome,

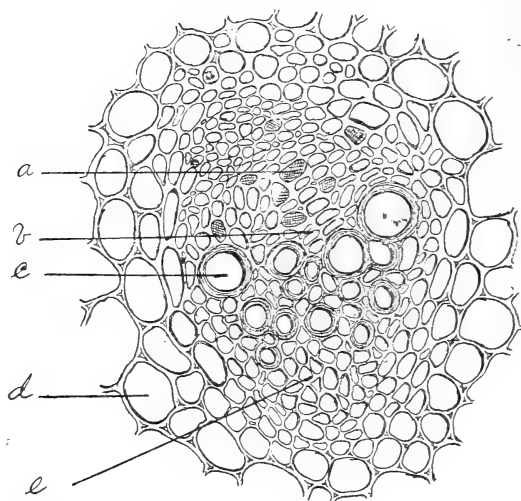


FIG. 3.

including the epidermis and sublying collenchyma, magnified 175 diameters. The section from which the drawing was made was cleared by means of hydrate of chloral solution, which also swells the cell walls, so that in the drawing they are shown of greater thickness than the normal. *a* is the rather thick cuticle; *b*, an epidermal cell; *c*, a tangential partition which has recently been formed across the outer layer of collenchyma cells, the outer of the two tiers of cells thus formed being the young cork, and the inner the phellogen or cork cambium; *d*, collenchyma cell farther interior. The collenchyma in its inner layers passes gradually into parenchyma.

The parenchyma tissues of the rhizome show no special peculiarities. The cells are throughout heavily charged with starch grains.

The vascular bundles are the only portions of the structure which contain lignified tissues and here it is almost confined to the ducts of the xylem. These ducts are of moderate size, rather loosely arranged with soft tissues between, and occurring singly or in groups of a few. The smallest are in the inner part of the bundle and nearly all are either reticulate or scalariform, the one form passing into the other. An occasional spiral duct of small size is found in the inner part of the bundle. The other tissues of the xylem consist chiefly of wood parenchyma, no wood cells being developed.

In the phloem of the bundles are seen sieve tubes of moderate

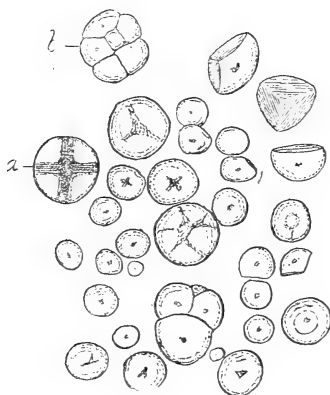


FIG. 4.

size, and companion cells along with other parenchymatous elements. In old rhizomes we find many of the cells of the phloem with the walls collapsed and variously wrinkled. No distinct sheath is traceable about the bundle.

*Fig. 3* shows one of the bundles magnified 175 diameters. *a* is a sieve-plate; *b*, meristem tissue; *c*, a duct in the xylem; *d*, a parenchyma cell exterior to the bundle; *e*, wood parenchyma of the bundle.

In the outer part of the phloem there are sometimes, though not always, found a few cells of rather large diameter having somewhat thickened and lignified walls. These, when viewed in longitudinal section, are found to consist each of a single row of elongated cells, which together resemble a bast fibre in appearance. They are, in

fact, probably to be regarded as imperfectly developed bast fibres. The cells contain starch, though not so abundantly as the adjacent parenchyma cells of the cortex. It must be remarked that these fibres do not occur in all the bundles.

Fig. 5 shows one of the small bundles, exterior to the primary circle, magnified 330 diameters. *b, b, b, b, b* are the fibres in question; *c*, a sieve-cell; *d, d, d*, ducts in the xylem; *e*, wood parenchyma; and *a, a*, cortical parenchyma cells.

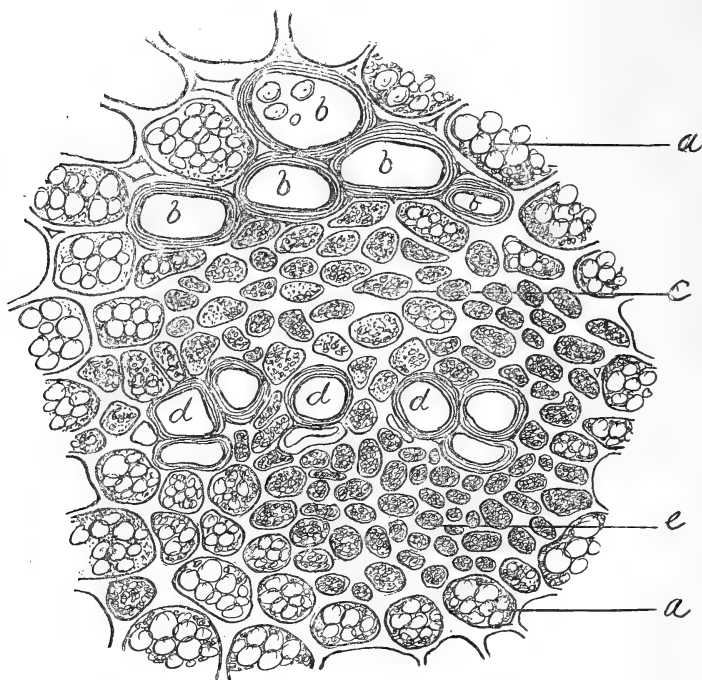


FIG. 5.

Several roots were examined with reference to the structure of the central radial bundle. In the specimens examined, the number of xylem rays in the bundle was found to vary between three and six, the commonest numbers being five and six. The central part is sometimes wholly parenchymatous and sometimes contains scattered ducts. The endodermal sheath is composed of quite regularly arranged cells, all somewhat elongated in a tangential direction, and having the radial walls a little darker in color. The pericambium,

immediately within the endodermis is composed of somewhat larger cells, also somewhat elongated in a tangential direction. The ducts only are lignified.

*Fig. 6* shows one of the bundles magnified 175 diameters. The section from which the drawing was made had been cleared of starch and albuminous matters. *a*, a cell of the endodermis; *b*, a cell of the pericambium; *c*, small ducts at the extremity of one of the xylem rays; *d*, phloem.

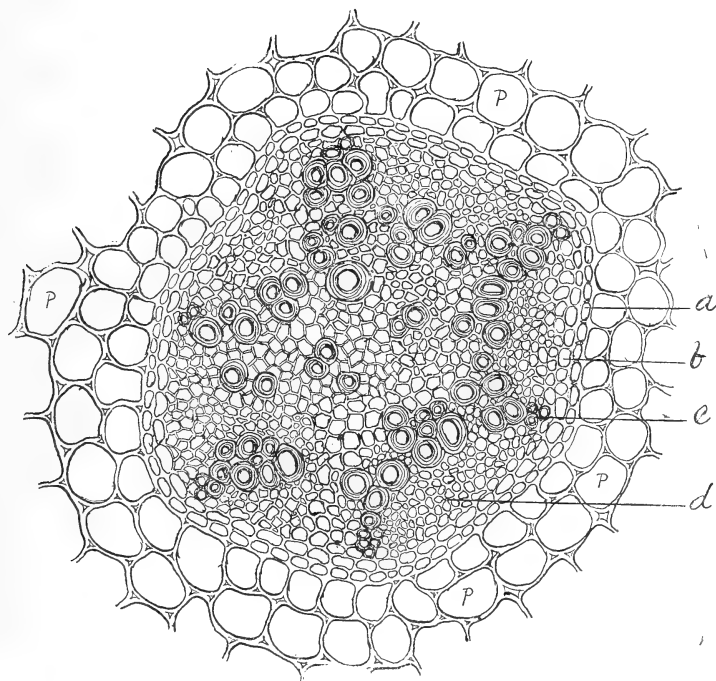


FIG. 6.

The starch of podophyllum (*Fig. 4*) is rather small-grained and very abundant. Many of the grains are simple and spherical or nearly so, but many others show one or more flat faces, indicating that they have formed a part of a compound grain. Many of the larger grains appear more or less lobulated, and some of those which are nearly perfectly spherical show radial markings extending from the centre nearly to the circumference. These are really compound grains, as is readily shown by treating them with a strong solution of chloral

hydrate in which a little iodine is dissolved, when they separate into their component granules. The hilum is central (though often difficult to see without staining), and the polarization cross is therefore rectangular. A few of the larger simple grains show one or two circular stratification lines, but these as a usual thing are difficult to see without staining.

No special secretion cells and no intercellular secretion reservoirs exist either in the roots or rhizome. The resin that gives to the drug its special value is not directly recognizable in the cells, but its presence may be made known by means of tests. The following were applied, both leading to the same result. Sections were treated with a solution of alcannin in 50 per cent. alcohol for an hour or more and then examined, when it was found that a deep red color was developed in many of the cells, indicating the presence of either resinous or oily matter.

The color was most intense in the soft tissues of the vascular bundles, but the contents of many of the collenchyma cells, and of many of the parenchyma cells, both of the cortex and of the pith were strongly colored. There were few of the thin-walled cells that did not give some indications of the presence of resin, though in many the quantity was small. In a few instances, the resin seemed to exist in the cells in masses of some size, as large as some of the larger starch grains, or even larger.

As a confirmatory test, pieces of the rhizome were soaked for several days in solution of copper acetate, and then sections were made and examined. The deep green color, indicative of resin, was present in the majority of the cells and strongly developed in some. The distribution of the stain was similar to that which was observed as the result of the previous test.

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## FUNGI.

BY HENRY KRAEMER.

During the past year or two the Fungi have received increased attention by both botanists and chemists. The term fungi by many writers is used to include all of those cryptogams that do not possess chlorophyll. Hence the Saccharomycetes, Schizomycetes, Mucorini and Peronosporæ are included in this classification. The fungus of

rye—ergot—has been known for many years. The sphacelial stage of development was not known until 1841, when Meyen pointed this out. Literature to-day is filled with the results of different workers who have struggled with the separation of the constituents of ergot. The “rusts” have received careful attention by the Department of Agriculture, and now, very recently, have been issued by the Government Printing Office, Washington, D. C., four important pamphlets on the twenty-four edible and twelve poisonous mushrooms of the United States, with directions for their identification and preparation as food. This is the work of Thomas Taylor, Chief of the Division of Microscopy, and the pamphlets in their timely appearance reflect great credit to the department. At this time, when the fungi are so abundant in our damp woods, we desire to call attention to a scientific and convenient classification of the fungi of the Carposporeæ and to the recent developments in the physiology and chemistry of the same.

CARPOSPOREÆ.

Group.	Sub-Group.
I. <i>Basidiomycetes</i> : produce <i>basidia</i> contain- ing <i>basidiospores</i> .	(1) <i>Gasteromycetes</i> —spores produced in closed cavities; e. g., <i>bovista</i> , <i>phallus</i> . (2) <i>Hymenomycetes</i> , spores not produced in closed cavities; e. g., <i>hydnum</i> , <i>polyporus</i> . (3) <i>Tremellineæ</i> , jelly-like mass; fruit scattered on the surface; e. g., <i>tremelline</i> .
II. <i>Ascomycetes</i> : produce an <i>asci</i> in which <i>ascospores</i> are contained.	(1) <i>Discomycetes</i> , fruit a cup-shaped body— <i>apothecium</i> ; e. g., <i>morchellus</i> , <i>peziza</i> . (2) <i>Pyrenomycetes</i> , fruit body— <i>perithecium</i> —of various shapes but nearly closed, so that spores are inside; e. g., <i>claviceps</i> . (3) <i>Perisporeaceæ</i> , fruit body remains closed until it decays; e. g., <i>erysiphe</i> .

I. *Basidiomycetes* are saprophytes consisting of a mycelium and sporocarp. The *basidia* are arranged usually to form a hymenium. According as this is external or internal, the two important divisions are made.

*Hymenomycetes*, hymenium is external.

*Gasteromycetes*, hymenium is internal.

The sexual organs are supposed to precede the formation of a sporocarp.

(1) *Gasteromycetes* produce a mycelium that penetrates decaying

wood, etc. The sporocarp develops and is really what we term the plant. From basidiospore is produced a *mycelium*. When plants are well fed they produce the *schlerotium*. In a few days the resting stage has arrived and we observe a colorless inner tissue and a black rind, the cells of which are united into a firm tissue. A hypha branches repeatedly and the ramifications gather into a coil or cluster. This hypha coil forms inside of it (a) a nucleus of pale tissue; (b) the first rudiment of the stipe; and (c) on the outside an envelope of hyphæ, i. e.:

(1) On exterior—a *pseudoparenchyma* (rather thick) tissue.

(2) Centre of two parts: (a) *umbrella part* and (b) *stipe*.

On the umbrella part we find divisions known as *gills*.

Upon the gills arise a tissue called *trama*.

The outer part of the trama—bearing the spores—is called the *hymenial layer*.

The hymenial layer consists of three kinds of cells:

(a) *Cystides*—sterile spore cells.

(b) *Paraphyses*—tubular cells without septa or spores.

(c) *Basidia*—tubular cells, bearing spores.

The cavities containing the spores are called *gleba*.

In the Gasteromycetes we have: Bovista, Lycoperdon, Geaster, Phallus, Cyathus, etc.

(2) The *Hymenomycetes* represent the highest group of the chlorophyll free Carposporeæ. Upon the mycelium arise the young sporocarps. These are composed of parallel hyphæ, which send out lateral branches at the top, forming the umbrella-shaped *pileus*, common in many of the genera. Later an opening arises and a tissue develops between this opening and the margin of the sporocarp, forming the *veil*—which finally, by reason of the rapid growth of the pileus, becomes ruptured. Upon the under side of the pileus develop *gills*, which latter develop upon their surface a hymenial layer, which latter bears *basidia* and also bladder-shaped cells called *cystidia*.

The Hymenomycetes contain the larger fungi, many of which are edible. The important common genera of this group are: Agaricus, Hydnum, Polyporus, Clavaria, etc.

(3) *Tremellineæ* are nearly related to the Hymenomycetes and by some included therein. They are gelatinous fungi, of irregular shape, and on the surface produce a hymenial layer with spores.



The Tremellineæ are found on wet tree trunks rather than on dead branches or upon the ground.

(II) The *Ascomycetes* differ from all other Carposporeæ in producing their spores in sacs. The spores are a result of an act of fertilization. The sexual organs consist of carpogonium and antheridium. As a result of fertilization, a sporocarp is produced (by growth of enveloping cells), which is technically called the *perithecium*. It is frequently appendaged, contains an *ascus* and generally eight *ascospores*.

The methods of reproduction are by :

(a) *Ascospores*.

(b) Spores called *macrostylospores* produced in a receptacle called *pycnidium*.

(c) Spores called *microstylospores* produced in a *spermagonium*.

(d) A sexual spore cut off singly or in chains from fruit hypha.

(1) *Discomycetes*, fruit body open entirely from the first or when ripe—called apothecium. They are generally disc-like or cup-shaped saprophytes, frequently attaining large dimensions. It includes *Peziza*, *Ascobolus*, *Morchella*, etc.

(2) *Pyrenomycetes* possess hard or coriaceous tissues, the hymenium is in deep cavities (*perithecia*) with small openings. It includes *Claviceps*, *Sphæria*, etc.

(3) *Perisporeacæ* (*Erysiphacæ*) are parasitic plants forming a white film on leaves and stems. The fruit body remains closed until it decays.

In *Gymnoasci* we have plants in which the asci are scattered over the mycelium—not in a fruit body.

*Uredineæ*, now called *Æcidiumycetes*, produce a cup-shaped fruit (*Æcidium*-fruit), from the open top spores are discharged. The bottom part forms a hymenium from which new spores arise. The Smuts and Rusts are included here.

Prof. Bourquelot, in a paper read before the Academy of Sciences of Paris, last year, pointed out that the parasitical mushrooms produce a soluble ferment analogous to emulsin. It possesses the property of dissolving various glucosides, as amygdalin, salicin, coniferin, etc. Willow trees, pine trees and poplars, etc., are attacked by various species of fungi. Consequently, argues Bourquelot, owing to this ferment which they secrete, all parasitical mushrooms can utilize the glucosides contained in the trees upon which they

subsist, which under its influence produces a variety of products, among which is glucose.

E. Winterstein, in *Ber. d. Chem. Ges.*, 1893, 3098, records the presence of another carbohydrate—*paradextrin*—besides trehalose in *Boletus edulis*. It possesses the formula ( $C_6H_{10}O_5$ ) and may be therefore classed among the carbohydrates. From a medicinal standpoint, another interesting property is recorded for *Lycoperdon giganteum*, by Dr. A. L. Hall (*Medical Rec.*, 1893, No. 1186). He has employed it in several cases of nasal hemorrhage with prompt and efficacious results. He considers this *Lycoperdon* to be superior to many other hemostatics on account of its non-irritating properties.

A most valuable physiological observation has been observed by W. Wahrlich (*Bot. Centralb.*, 1893, 368). He has found a continuation of protoplasm between the cells of all the fungi examined, with the single exception of *Oidium lactis*. This has been seen not only between the vegetative cells of the hyphæ, but also between those of the asci and those of the ascospores, and in some cases between the cells of multicellular spores. In all cases, the septum exhibited a single central pore and was traversed by a string of protoplasm of uniform breadth. The pore is not formed by resorption of a portion of the membrane, but exists from the first. This was especially well seen in young cultures of *Achorion Schonleinii*. From the absence of protoplasmic connections in those fungi in which each cell is independently nourished, such as *Oidium*, and in some pili-form algæ, Wahrlich concludes that they are the agents for the transport of food material, by means of which the granular protoplasm is conveyed from cell to cell. This was observed directly in *Eurotium repens*.

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## THE INTERACTION OF BORAX, CARBONATES AND POLYHYDRIC ALCOHOLS; ALSO, THE COMPOSITION OF BORAX.

BY LYMAN F. KEBLER, PH.C., B.S.

It was profoundly stated by Lord Bacon that "In all generations and transformations of bodies, we should inquire what is added, what remains and what is lost; what is united and what is separated." This is the true character of inductive philosophy, careful

observation and rigid analysis. These sentiments are applicable to the questions in hand as well as to the many difficult problems constantly inviting our sober thoughts.

From statements made in certain<sup>1</sup> lines of literature we are led to infer that on mixing *borax*, *sodium bicarbonate* and *glycerin*, a certain chemical reaction ensues in which there are formed normal sodium carbonate and carbon dioxide. This is equivalent to saying that there is no interaction, as far as the carbonate is concerned, when a normal alkaline carbonate is employed instead of the acid carbonate.

Recently the writer had occasion to establish the presence or absence of sodium bicarbonate as an adulterant in a sample of borax. After having exhausted all the available tests of any standing without any definite results, recourse was sought in the above reaction, but it was soon discovered that the same reaction resulted with the normal carbonate, only less energetic. Being somewhat surprised at this unexpected phenomenon, the writer made an investigation, and soon found that the same result was reported some six years ago by C. Jehn.<sup>2</sup>

D. Klein,<sup>3</sup> and the same year A. Senier<sup>4</sup> and A. J. G. Lowe showed that an acid reaction resulted when borax is dissolved in glycerin. W. R. Dunstan<sup>5</sup> also made a comprehensive report on the reaction of polyhydric alcohols and borax. The acid reaction results not only with the polyhydric alcohol glycerin, but also with many other polyhydric alcohols, as manitol, erythrol, levulose, dextrose, glucose,  $\alpha$ -galactose and  $\beta$ -galactose. Undoubtedly many other polyhydric alcohols, as sucrose, raffinose, lactose, dulcitol, quercite, etc., would produce the same results if subjected to the proper conditions.

It is reported that borax is even decomposed by water, for Rose<sup>6</sup> has shown that strong solutions of this salt give precipitates of silver borate, while dilute solutions precipitate argentic oxide, like an alkali.

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<sup>1</sup> National Dispensatory, 5th Ed., page 1455.

<sup>2</sup> 1888, Arch. der Pharm., (3) 26, 495; Am. J. Pharm., 60, 455.

<sup>3</sup> 1878, Bull. Soc. Chim., 29, 195; Comp. rend. 86, 826.

<sup>4</sup> 1878, Pharm. J. Trans. (3), 8, 819.

<sup>5</sup> 1883, Pharm. J. Trans. (3), 13, 257; Am. J. Pharm. 55, 447.

<sup>6</sup> Mendeléeff's Principles of Chemistry, Eng. Ed., Vol. 2, p. 60.

The acidity is unquestionably due to the transformation of the borax into sodium metaborate and boric anhydride, the latter uniting with water to form boric acid. As significant evidence substantiating the above statement, may be noted that no acid reaction results in the absence of water, for on using anhydrous borax, anhydrous glycerin and elevating the temperature so as to expel the water formed during the reaction, no acid reaction results.

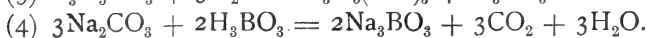
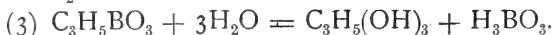
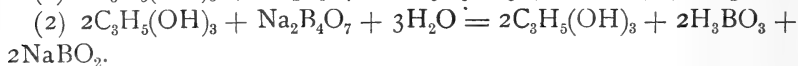
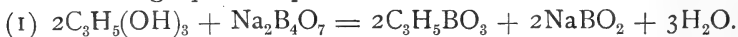
A support to the above composition of borax may be found in the formation of tetraboric acid. When orthoboric acid is heated there are formed at  $100^{\circ}$  C. metaboric acid and water— $\text{H}_3\text{BO}_3 = \text{HBO}_2 + \text{H}_2\text{O}$ ; at  $160^{\circ}$  C. it yields tetraboric acid and water— $4 \text{H}_3\text{BO}_3 = \text{H}_2\text{B}_4\text{O}_7 + 5 \text{H}_2\text{O}$ ; at a still higher temperature all the water is eliminated and boric anhydride is formed— $\text{H}_2\text{B}_4\text{O}_7 = 2 \text{B}_2\text{O}_3 + \text{H}_2\text{O}$ .

Tetraboric acid is the intermediate compound from which only a portion of the water has been eliminated; that is, it is neither metaboric acid nor boric anhydride, but a mixture of the two. In that borax is a salt of tetraboric acid it must necessarily share an analogous composition. Direct evidence that borax is so constituted is insufficient but indirect evidence appears to be ample.

The avidity of boric acid is unity when nitric acid is taken as one hundred. Boric acid displaces carbonic acid, and *vice versa*, depending on the conditions; consequently the avidity of carbonic acid must be about unity.

It appears to be well established that the acidity, above referred to, is due to boric acid; therefore all carbonates transposable by this acid will evolve carbon dioxide with the simultaneous formation of sodium metaborate and sodium orthoborate when mixed with borax and glycerin.

The following equations present the facts in a most lucid manner:



The first equation represents the reaction when there is no water present, that formed being expelled by heat; the second when water is present; the third the action of water on boroglycerol, and the last simply the action of boric acid on an alkaline carbonate.

When calcined sodium carbonate is fused with boric acid ordinary borax is produced.

Boric acid may replace successively the hydroxyl groups of polyhydric alcohols, forming mono-, di-, tri- and poly-products; therefore we may have simultaneously formed one or more products of transformation.

Glycerin here evidently plays the part of a catalytic, as sulphuric acid does in the formation of ether from alcohol. Thus alcohol is not converted into ether and water by boiling alone, but is so converted by boiling with sulphuric acid. The catalytic function of polyhydric alcohols is very clearly typified in the action of glycerin on borax. The quantity of glycerin has neither increased nor decreased, but has nevertheless taken part in the several reactions, which would not have resulted but for the presence of glycerin, or some other polyhydric alcohol, or an aldehyde.

Catalysis has been of no small service in advancing stereometric chemistry through the agency of micro-organisms, so admirably adapted for mesotomising various asymmetric carbon compounds, as the amylic alcohols, propylene glycol, mandelic acid, glyceric acid and many others, through the agency of organized ferments, such as *penicillium glauca*, *bacterium termo*, etc.

Unfortunately we do not possess, in the inorganic field, an invaluable polariscope, which will reveal to us at a glance the ultimate transformations of a body under given conditions.

LABORATORY, SMITH, KLINE & FRENCH CO.

PHILADELPHIA, July 18, 1894.

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## FOLIA SCOPOLIÆ CARNIOLICÆ.

BY J. B. NAGELVOORT.

Since Professor E. Schmidt (Marburg) has established a place for *scopolamine*, which is due it in the list of alkaloids, it may be welcome to the readers of the AMERICAN JOURNAL OF PHARMACY to have a record of an answer to the question: Do the leaves of *Scopolia carniolica* also contain scopolamine?

The writer has been in a favorable position to speak on this subject, as I have, for the past two years, had a vigorous plant of *sco-polia carniolica* in my garden for the purpose of identifying its alkaloid with commercial hyoscyne.

The plant answered to the description given in De Candolle's *Prodomus*.

There is very little analogy in the vegetable kingdom to guide one in predicting the presence of an alkaloid. The leaves of *Conium maculatum* contain only a minute quantity of coniine; the leaves of most of the *Solanaceæ*, *Ranunculaceæ* and *Umbelliferæ* are reputed to be poisonous, yet there are plants in those very families which are perfectly harmless. We see in the tomato (a Solanæa) what cultivation will do for a poisonous plant. Coca and tea leaves only need mentioning.

The scopolia was cultivated, and cultivated plants are very frequently poorer in alkaloidal strength than those growing wild. Such freaks of nature are frequently met with. Cinchona is a brilliant exception. It is a mooted question yet about cultivated ipecac. I have assayed roots cultivated in India, but have not found any higher percentage of total alkaloids in them, than in those gathered wild in the South American forests.

I collected a little over thirty grams of air-dry leaves from my scopolia plant. On submitting 7.5 grams to an exhaustion process with the well-known Prollius' mixture, in the usual way, neither gold chloride nor Vitali's test for mydriatic alkaloids yielded a reaction with the residue obtained as the last step in the analysis. Hyoscyne always gives me both identity reactions.

Twenty-five grams of air-dry leaves were thereupon exhausted with 75 per cent. alcohol; the latter was evaporated at a temperature not exceeding 50° C. The residue was exhausted with acidulated water; this latter was washed with benzine, then made alkaline and extracted with a mixture of ether and chloroform. The experiments on the presence of an alkaloid were *totally negative*.

The reader will please bear in mind that this is an isolated case. It is not an unfrequent occurrence that great fluctuations are found in the alkaloidal strength of our medicinal plants.

DETROIT, August 1, 1894.

## THE OPIUM ASSAY METHOD OF THE NEW PHARMACOPŒIA.

BY FRANK X. MOERK, PH.G.

Owing, no doubt, to the legal requirements that no opium shall enter this country having less than 9 per cent. of morphine, this drug stands at the head of the list, if we consider the number of methods of assay that have been published; a large number of the methods are simply modifications of two or three fundamental ones which, themselves, can be placed into one of two classes depending upon the extraction of the opium; if this is carried to completion, and the finished assay represents the whole quantity of opium started with, we get the process of Dr. Squibb and its numerous modifications; if, on the other hand, the opium is macerated with a definite weight of water and the assay is finished by the use of an aliquot part of this aqueous solution, we get the methods proposed by Professor Flückiger, by E. Dieterich (adopted by several European pharmacopœias), that adopted by the United States Pharmacopœia of 1880 (the so-called lime process), etc., etc.

Some of the objections which Dr. Squibb sets forth against the trustworthiness of this second class of assays are convincing. His determinations of the quantity of extractive matter in opium show that this is subject to considerable variation; in one of his publications he quotes the figures obtained in the examination of the last eleven lots of opium in which the dry, insoluble residue amounted to from 25 to 42 per cent. (average 32 per cent.); this, of course, means that the substances extracted (extractive matter and moisture) varied from 58 to 75 per cent. (average 68 per cent.); the methods, therefore, like those of Flückiger and Dieterich, in which is assumed that all opiums yield 60 per cent. to water, cannot be considered reliable, because based upon something which is proven to be variable. While this objection is undoubtedly correct and it is believed that *comparable* figures would indicate the same relative variation, it must be remembered that in Squibb's process one part opium is extracted with about thirty-two parts of water, while in Dieterich's process only eight parts water are used for one part opium; it is evident, therefore, that the former must extract considerable more of the difficultly soluble opium constituents than the latter, and hence, a partial extraction *cannot be compared* with an

(intended) complete extraction, although this is not even attained by the process of Squibb, as he himself calls attention to the color and the bitter taste imparted to water after extracting the opium with thirty-two parts of water.

A second objection to these methods is that the morphine is precipitated from a too dilute solution, the morphine remaining in solution depending upon the quantity of the mother-liquor, and claims as a special value of his method the precipitation from a concentrated solution. Dieterich, by a method to be given later, claims to have determined the morphine left in the mother-liquor of his process, and states it to vary from 0.2 to 0.65 per cent., depending upon the kind of opium and the solvent used to remove narcotine, etc. (using ether as this liquid 0.44-0.66 per cent., using acetic ether 0.18-0.57 per cent.); upon the strength of these determinations Dieterich announces that the aqueous solution (1 : 8) from which he precipitates the morphine is a poorer solvent for morphine than an aqueous solution containing the same quantity of ammonia; this favorable result he believes to be due to the presence of the extractive matter of the opium which facilitates the precipitation of the morphine.

In Squibb's process the aqueous extract, concentrated to twice the weight of the opium, is mixed with half its weight of alcohol, making about a 30 per cent. alcohol solution, although the subsequent addition of ether removes part of the alcohol, and leaves a more dilute alcoholic liquid saturated with ether; the alcohol is absolutely necessary in this process to keep the large amount of coloring matter from precipitating with the morphine. Dr. Squibb quotes that an investigator, probably P. Carles, determined that a 33 per cent. alcohol had a low solvent power for morphine, and repeatedly calls attention to the fact that his process indicates all of the morphine except that remaining in the mother-liquor, which, of course, constitutes a saturated solution; no attempt has been made to ascertain what amount is retained in the mother-liquor, but it is stated that the mother-liquor has a somewhat variable solvent power for morphine, greater for morphine in the nascent state than for morphine added to it; the solvent power is greater than that of a clean solution of alcohol and water made to represent the mother-liquor; the precipitation of coloring and other matter which may finally be weighed with the morphine will not more than counter-



balance the quantity of morphine lost to the assay by remaining dissolved in the mother-liquor and washings. In Vol. III, No. 2, page 965, of the "Ephemeris" (published in October, 1887) is found the following paragraph: "The process has been criticised as yielding results that were too high. This criticism can only be justified by weighing substances as morphine which are not morphine, and it is feared that this may have been done through a fault in the original paper in regard to the lime-water testing of the results, in order to correct them by the subtraction of matters insoluble in lime-water. This is given in the paper, without particular emphasis, and merely as a test for the presence or absence of narcotine, when, though narcotine can hardly ever be present, other matters equally insoluble with narcotine are very often thrown down with the morphine and must be filtered out, weighed and subtracted for a proper correction of the results."

In 1886, Dieterich published the results of experiments, proving that the presence of alcohol in the liquor (made 1:10 at that time) from which morphine is precipitated, caused also the precipitation of calcium meconate, which was estimated by igniting the morphine and calculating from the ash which was stated to be *pure calcium carbonate*; the results were expressed in the statement:

"The separation of the morphine proceeds slowly, and with the least quantity of lime salts if allowed to stand quietly; proportionate to the amount of agitation the separation of the morphine proceeds more quickly, is more abundant and contains more lime salt."

The addition of alcohol is objected to by Dieterich as of vital importance, since morphine is soluble in alcohol, therefore the alcoholic mother-liquor will always retain more morphine than an aqueous mother-liquor. Professor Flückiger, in one of his articles on opium assaying, admits that the amount of morphine lost to the assay depends especially upon the quantity of alcohol present; the smaller the quantity, the smaller the loss; the greater the quantity the purer the precipitated morphine. To one of these objections relating to the presence of alcohol the view of Dr. Squibb has been given; the other relating to the precipitation of calcium salts in the presence of alcohol is admitted as having been "experimentally demonstrated to be sound." Dr. Squibb then continues:

"But then he (Dieterich) precipitated from so large a volume of liquid as to vitiate his conclusions if applied to small volumes of

liquid. He precipitated the morphine from solutions weighing five, six, seven, eight and ten times the weight of the opium and gets his best results from a solution of eight times the weight. Thus he prefers a solution of eighty grams for precipitation, while this writer (Squibb) prefers one of twenty grams, and it will easily be seen that the presence of alcohol in these two solutions will have a very different bearing upon the results."

In the controversy between these two defenders of the two methods of opium assays their objects should not be lost sight of. Dr. Squibb aims to ascertain as near as possible the total quantity of morphine in the opium; to accomplish this he spares neither time nor labor in the extraction of the opium, and does not object to the further examination of his morphine for purity and, in fact, as already stated, claims that it is necessary to correct the results for matters precipitated which are not morphine; his claim for the method is that the assays will only vary within 0.2 to 0.3 per cent. E. Dieterich aims to perfect a process which is expeditious, which will yield a pure morphine not requiring a subsequent correction of results, which will give results agreeing within 0.3 per cent., and which will indicate to within 0.5 per cent. the morphine in the opium, which is claimed to be sufficiently accurate for pharmaceutical purposes; (this apparently is the extent of the morphine left in the mother-liquor and does not include the variable source of error due to the taking of an aliquot part of the filtrate).

In the *AMERICAN JOURNAL OF PHARMACY*, 1891, p. 113, was published a paper by Mr. Wm. T. Hankey, in which it was shown that the morphine by Squibb's process always yielded some ash upon ignition; the ash is stated to be calcium oxide, due to the decomposition of calcium meconate, and the factor 4.55 is given to convert the calcium oxide into meconate, which then is to be subtracted from the weight of the crude morphine. A careful reading of this paper does not show that an examination of the ash was made, but finding that the ash calculated to calcium meconate by the above factor gave an almost identical figure with the insoluble residue left upon treating the crude morphine with hot absolute alcohol as directed by C. M. Stillwell in his correction of results by Squibb's process, and which residue is by him (Stillwell) stated to be calcium meconate, it was an easy matter to forego this examination. The corrections to be made according to this paper vary from 0.59 to

2.23 per cent.; the correction by the use of lime-water is stated to be less convenient and less accurate than by the use of alcohol, and not to be compared with the ash method, but no figures substantiate this statement. Other publications could be quoted showing the impurity of the morphine by Squibb's process, but more appears useless since the author of the method insists upon a necessary correction.

One other point may be mentioned here concerning the influence of an excess of the morphine precipitant, ammonia: E Dieterich, in his dilute solutions, finds that the ammonia may be present in pretty fair excess without affecting the results, while Dr. Squibb has found that an excess of ammonia will prevent the precipitation of the maximum quantity of morphine, and advises that the quantity of ammonia be reduced for inferior samples of opium.

This review of the important points in opium assaying is not occasioned by the desire to offer a new process, but to assist in the explanation of some observations recently made while assaying two samples of opium; these observations, it is hoped, will be confirmed by others working in this line of assay work; the suggestions made must not be considered as reserving to the writer this field of work, but as an invitation for the co-operation of all desiring to have this opium assay method perfected.

The process adopted by the pharmacopœia of 1890 is that of Dr. Squibb with the improvement, originally proposed by E. T. Teschemacher, of washing the crude morphine with morphiated alcohol (Teschemacher's morphiated spirit contained some ammonia, whereas the pharmacopœia uses simply alcohol saturated with morphine) and with the serious oversight of not giving a test for the purity of the weighed morphine; this need not be amplified upon, as the previous and subsequent parts of the paper prove the necessity.

A sample of powdered opium was used for the first set of assays; the pharmacopœia process was followed until the washing with alcohol and ether was directed, so that by simply washing with water we have the original process of Dr. Squibb. To determine if it was necessary to postpone evaporation of the opium filtrate until the second filtrate was ready, in Nos. 2 and 3, the first filtrate was used as soon as obtained, and the second filtrate added to the concentrated first filtrate; the results would indicate that no loss of

morphine is incurred by this manipulation. The results are tabulated and necessary explanations follow:

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Hours allowed for the precipitation of the morphine. }	17	18	18	41	41
Quantity (cc.) of wash water used. }	15	20	20	30	30
Weight of crude morphine on weighed filter. }	1'6315	1'5675	1'5595	1'5495	1'5075
Weight of same on watch crystal. }	1'560	1'526	1'498	1'479	1'454
Impurity taken up by the weighed filter. }	0'0715	0'0415	0'0615	0'0705	0'0535
Ash as $\text{CaCO}_3$ from 1 gram crude morphine. }	0'052	0'0505	0'042	0'0425	0'0425
Ash $\times 2.56 =$ calcium meconate; calculated for entire weight of morphine. }	0'208	0'197	0'161	0'161	0'158
Corrected weight of morphine. }	1'352	1'329	1'337	1'318	1'296

In washing the morphine from Nos. 1-3 with water, it was noticed that the washings were turbid, and that after mixing with the mother-liquor, a very distinct and increasing precipitate commenced to form, so that in Nos. 4 and 5, the mother-liquors and washings were collected separately; this procedure enabled me to show that by keeping these mother-liquors for about a month, only a very slight further precipitation took place, while in the washings a very notable quantity of a fine whitish or pale brownish precipitate separated in a very short time, this apparently was part of the precipitate collected upon the filter and caused to run through the filters after the mother-liquor was replaced by the wash water; the differences in weight of the crude morphine are undoubtedly due, in part at least, to the varying quantities of water used in washing, which removed not only more or less of the coloring matter, but also more or less of the above fine precipitate; attempts to collect this fine precipitate upon a filter were only partly successful, as a considerable portion ran through the filter; it was afterward obtained by

allowing to settle and washing by decantation. In experiments made by Dr. Squibb upon the respective merits of the alcohol and the lime-water corrections for the impurities in the crude morphine, reference is made to the difficulty of filtering the alcoholic solution; the insoluble matter, owing to its being an extremely fine powder, was very apt to run through the filter. Finding that both methods gave practically the same correction, Dr. Squibb determined to continue to use the lime-water test as here given, there was no difficulty in filtering. To one of these mother-liquors (No. 5), after standing for about a month, was added as much water as was used in washing and set aside for a week, when, to all appearances, a somewhat increased precipitate was to be noticed; lack of time not permitting an investigation of this precipitate, it would not seem justifiable to state this additional precipitate to be *morphine* thrown out by diluting the alcoholic mother-liquor with water.

In determining the purity of the morphine by the ignition method one gram was taken and by the careful application of heat, the morphine was first charred (in this part of the operation it was possible to find in the upper part of the crucible or on the lid, very well formed crystals of morphine) and then by the application of more heat, the crucible contents incinerated at a low red heat; the ignition of the ash so as to form calcium oxide, while suitable for those having all laboratory conveniences, is not often suitable for the pharmacist, therefore, the ash obtained at a low red heat is best moistened, after cooling, with a few drops of solution of ammonium carbonate, and gently heated first until dry and then at a very low red heat; this will insure the ash to consist of carbonate which, multiplied by the factor 2.56, gives the corresponding quantity of meconate. This alteration had, as a consequence, the examination of the ash, for on moistening with water and ascertaining its effect upon litmus paper, I was surprised to find a very strong alkaline reaction (no matter how small the quantity of ash, an alkaline reaction was always observed with litmus paper); as this could not be due to caustic lime, because the treatment with ammonium carbonate was for the express purpose of changing any caustic lime into the carbonate, the only other explanation, which was verified, was that alkaline carbonates were present; upon filtering off the ash insoluble in water and adding hydrochloric acid to the filtrate, a very distinct effervescence was noticeable; this acid solution gave

tests for potassium and sodium, also for sulphuric acid; the part insoluble in water was composed very largely of carbonates, but was not entirely soluble in the mineral acids due to a small quantity of silica which is present; the acid solution gave tests for aluminum, phosphoric acid and magnesium, but calcium salts were the chief constituents. This examination of the ash (if the opium was not an exceptional sample) makes the correction based upon it an exceedingly arbitrary one; therefore, while in the next set of experiments this correction is still used, it is only for comparison with the lime-water test.

The precipitation of such a complex mixture of salts of the metals, is, in all probability, due to the use of so much water in the extraction which dissolves considerable of the opium constituents only slightly soluble in water, (the residue from the opium extraction treated with more water gave an acid filtrate with which the meconic acid test could always be obtained and with which the test for calcium succeeded at times); the concentrating of these acidulous filtrates involves no precipitation of mineral matter due to the accompanying concentration of the acid present, the addition of alcohol even to the concentrated solution produces no precipitation (in the course of three to four hours), probably due to the solubility of meconic acid and the acid meconates in the diluted alcohol; the precipitation is caused by the addition of ammonia, changing the acid into an alkaline reaction, but is not immediate, requiring probably as much as three hours before it commences, and probably as much as thirty-six to forty hours before it is complete.

In the *AMERICAN JOURNAL OF PHARMACY*, 1891, page 164, was published a paper by Dr. Alfred Dohme, on "The Chemistry of Opium," in which the following quantitative analysis of the ash is recorded:

Ash equals 3.89 per cent. containing in 100 parts:

Silica, 11.14; phosphoric oxide, 8.07; sulphuric oxide, 28.39; ferric oxide, 1.98; calcium oxide, 9.04; magnesia, 8.31; potassium oxide, 30.19; carbonic oxide, hydrochloric acid and not determined constituents, 2.88; one of the conclusions arrived at in this paper, namely, "that the silica in opium is present in the form of sand" cannot be accepted as being entirely correct, since some silica was found in the ash of the crude morphine, and this must have been present in solution. The finding of such a large quantity of potas-

sium salts in the ash of opium explains its possible presence in the precipitated morphine.

As the ash is no doubt caused by the ignition of that portion of the precipitate not morphine which remains upon the filter, a few experiments made with the precipitate obtained from the wash waters may be mentioned: A little of the precipitate with hydrochloric acid and ferric chloride gave the test for meconic acid; a little of it ignited, moistened with ammonium carbonate, dried and again ignited, gave a residue having an alkaline reaction towards litmus paper, showing the presence of soluble alkaline carbonates and proving the sparing solubility of the salt giving rise thereto; a larger quantity did not appear to be much acted upon by dilute hydrochloric acid until it was heated, then it dissolved forming a brownish-colored solution, upon cooling, however, a bulky deposit of crystals separated (agreeing with statements in text-books regarding the formation of calcium bimeconate from calcium meconate), the addition of alcohol to make about a 33 per cent. alcohol caused the solution of almost the entire quantity of crystals; if to this solution a small quantity of ammonia was added there was instantly produced the separation of a very fine almost white precipitate; an aqueous opium solution evaporated to dryness with calcium hydrate can be extracted with a 33 per cent. alcohol without showing traces of meconates, a 10 per cent. alcohol does not yield unmistakable signs of meconates. These experiments substantiate the explanation of the separation of this precipitate along with the morphine.

In the second set of experiments six assays were made, in all of which, excepting No. 4, the pharmacopœial directions were carefully followed; in No. 4, the alcohol was omitted, and, hence, a morphine was obtained having very much the appearance of powdered opium. Nos. 1 to 4 were made with the powdered opium previously used, Nos. 5 and 6 were made with the same sample of gum opium, but the assays were made about two weeks apart.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
Hours allowed for the precipitation of the morphine. }	6½	7	21	7	6	21
Weight of crude morphine in counter-balanced filters. }	1'263	1'329	1'4505	1'403	1'235	1'275
Weight of crude morphine removed to watch-crystal. }	1'2555	1'313	1'451	1'3925	1'2305	1'267
Difference between these two weighings. }	0'0075	0'016	—	0'0105	0'0045	0'008
Ash as calcium carbonate from 0'5 gram crude morphine. }	0'002	0'012	0'0195	0'002	0'001	0'0135
Correction based upon the ash calculated to whole weight of morphine. }	0'013	0'081	0'145	0'014	0'0063	0'088
Corrected weight of morphine. }	1'2425	1'232	1'306	1'378	1'224	1'187
0'5 gram crude morphine dissolved in 50 cc. lime water left a residue weighing. }	0'0025	0'030	0'064	0'0205	0'001	0'031
The lime water residue calculated to entire weight of morphine. }	0'0062	0'079	0'186	0'057	0'0035	0'079
Corrected weight of morphine. }	1'249	1'234	1'265	1'335	1'228	1'196

In these assays, the ethereal solutions and the mother-liquor were collected together, while each of the washing liquids—water, alcohol and ether—were collected separately.

In washing with water the same turbidity and separation of precipitate was noticed as before ; the aqueous washings amounted to about thirty cubic centimetres to give an almost colorless filtrate, in all



cases the very last portions gave the test for meconic acid. The washing with alcohol is an improvement, since in every instance color was removed from the morphine; about fifteen cubic centimetres of the morphiated alcohol were used to obtain a practically colorless filtrate, in No. 4 about thirty cubic centimetres were used and then the alcohol was still colored (hence, in this process, washing the morphine with alcohol cannot replace the alcohol in the mother-liquor); the filters in the assays, excepting Nos. 3 and 4, were hardly stained after taking off the pale yellow morphine, which speaks well for this improvement of Squibb's process. The alcohol is here shown to be absolutely necessary; the appearance of the ethereal layer collected with the mother-liquor was, in all cases where alcohol was used, of a dark brown color; in the one case where alcohol was not used, it was only light yellow, so that the alcohol not only keeps the coloring matter dissolved in aqueous solution, but causes considerable of it to pass into the ethereal solution.

The use of the morphiated alcohol is sometimes stated to be only for the mechanical displacement of the water held by the morphine crystals, but this is not believed to be going far enough since we have here a means of getting rid of one of the impurities of the morphine without causing any appreciable error; the best method of applying this alcoholic morphine solution is to distribute two to three cubic centimetres at a time over the filter and precipitate and then covering with a watch-glass until dropping ceases, when another portion is added; the use of fifteen cubic centimetres cannot occasion a loss amounting to one cubic centimetre if carried out as directed. Considering the error possible by the evaporation of the alcohol with separation of morphine on the inner filter, which will then be weighed as though belonging to the assay, the following figures will give information: The pharmacopœia gives the solubility of morphine in alcohol as 1:300; E. Dieterich, 1:166. Dr. Squibb (in speaking of the purification of crude morphine by Stillwell's procedure, says 0.5 morphine will require about seventy-five cubic centimetres alcohol to dissolve it and hold it in solution when cold) makes the solubility in alcohol even greater; taking the last as 1:150, the fifteen cubic centimetres (approximately twelve grams) will hold in solution about 0.080 morphine, so that the largest possible error that could be incurred by the evaporation of all the alco-

hol would be 0.8 per cent., but guarding against loss by evaporation as directed and allowing a loss of one cubic centimetre, which is considered high, the loss is not greater than 0.05 per cent.

In this connection two sources of error may be mentioned, if the washing with alcohol and ether is not effected as promptly as possible; the first addition of the alcoholic solution to the water-wet crystals has, as a consequence, the formation of a dilute alcohol in which morphine is less soluble and hence may crystallize out; the addition of ether to an alcoholic solution of morphine lessens the solubility of morphine in alcohol, and again, a separation will take place. In collecting the wash-liquids, crystals were always observed to form, but never in the short time necessary to carry through these operations.

The mother-liquors set aside commenced to show additional precipitations, the quantity of these precipitates increased in the order given, 6, 3, 4, 5, 2 and 1, the first three containing notably less than the last three. What the deposit is has not yet been determined; from the assays 1, 2 and 3 it would seem to be matter not morphine, for we notice here that the correction increases with the length of time for precipitation. The second precipitate appears to vary indirectly with the time allowed for the first precipitation. Dr. Squibb, in referring to the length of time necessary for the precipitation of morphine, states that it is not surely complete in less than eight to ten hours, and considers it better to allow it to stand over night; as the results obtained in assays allowed to stand over night and those allowed to stand only six hours do not differ by more than 0.3 per cent., the claim of accuracy made for the method, it would appear that the supposition of Dr. Squibb that the second precipitate is meconate of calcium is, in the main, correct (it seems undoubtedly to be the mixture of salts giving rise to the ash and to the lime-water residue).

A study of the corrections by the ignition and the lime-water tests shows results that agree closely where the morphine, to start with, was practically free from color; in Nos. 3 and 4 the ignition method gives a correction which is too low, because the contaminating coloring matter is free from ash, and hence, the amount of color is recorded as pure morphine; this is another serious objection to this method, although its use is extended through the alcohol washing successfully removing color, except when the precipitation

occupies a long time. The correction by the lime-water test is more satisfactory, since the coloring matter precipitated from alkaline solution is not likely to dissolve in lime-water; to what extent the salts yielding the ash are dissolved by it is not known, but the lime-water solution of morphine gave, in every case, the test for meconic acid when acidified with hydrochloric acid and ferric chloride added, in Nos. 1, 4 and 5, where the quantity of ash was trifling, care had to be exercised so as to avoid an excess of the reagents which were found to interfere with the test.

As for narcotine, which is sometimes stated to be precipitated in this assay method, the ignition method and Stilwell's method will record narcotine as pure morphine, as narcotine, like morphine, leaves no ash; and again, both are soluble in alcohol; the lime-water test rejects all but traces of it, so that this again forms the best test. E. Dieterich, in examining morphine for narcotine, uses ether, which is a much better solvent for the latter than for the former.

The lime-water test is very easily applied so as to prevent frothing, which prevents the solvent action of the lime-water upon those particles entangled in the froth, by moistening 0.5 gram morphine very thoroughly with 5 cubic centimetres lime-water, and then adding the balance of 45 cubic centimetres; the contents are not to be violently agitated, but simply to be rotated frequently during half an hour, when the solution and precipitate, if any, are filtered through a pair of counterbalanced filters, the latter washed with 5 cubic centimetres of lime-water, then with 5 cubic centimetres distilled water, pressed between bibulous paper and dried at the same temperature at which the morphine was dried; if the drying was effected at 100° C., the lime-water residue must be subtracted before the calculation is made changing anhydrous into crystallized morphine.

From the foregoing will be seen the necessity for the following suggestions, embracing corrections and original investigations for the perfection of the official process:

- (1) A test for the purity of the weighed morphine.
- (2) Information as to the necessary time for the maximum precipitation of morphine.
- (3) Information as to the quantity of morphine left in the mother-liquor.

(4) Information as to the nature of the second precipitation (which Dr. Squibb states is probably meconate of calcium), and its effects, if any, upon the yield of morphine, if the assay be allowed to stand until no further precipitation takes place.

(5) Information as to the error involved by the solubility of the morphine impurities in the lime water test for the purity of morphine.

The following remarks may be of assistance in following up this matter:

(2), (3) and (4) will be helped along by collecting the ethereal solutions, the mother-liquors, and the several washings in separate containers. To solve (3) the mother-liquor and the aqueous washings must be taken together, freed from precipitate (which is to be examined separately for morphine), and then shaken out with two portions of chloroform of 30 cubic centimetres each, as first carried out by Dieterich (in Dieterich's process alcohol was added to the mother-liquor to make about a 20 per cent. alcohol solution before shaking with chloroform), the chloroform solution is evaporated to dryness, the residue dissolved in 2 cubic centimetres *n.* sulphuric acid, adding 3 cubic centimetres water, and 2 cubic centimetres *n.* ammonia, filtering, washing the filter and precipitate with a little water, mixing the filtrate and washings with 2 grams ether and 0.5 cubic centimetres *n.* ammonia, and setting aside for twenty-four hours to allow the crystallization of the morphine; by this method he claims to ascertain the entire quantity of morphine left in the mother-liquor varying from 0.2–0.65 per cent.

(5) can very likely be solved by collecting the precipitates occurring in the mother-liquor and aqueous washing, drying, taking a definite weight (0.5 gram) and putting it through the lime-water test; the difference in weight before and after will indicate the quantity going into solution; as a control experiment this purified precipitate can be tested a second time by solution in lime-water.

ON AMERICAN ISINGLASS AS A SUBSTITUTE FOR  
GELATIN-PRODUCING TISSUE IN THE QUANTI-  
TATIVE ESTIMATION OF TANNIC ACID.

BY PROF. W. T. WENZEL.

The absorption of tannic acid by means of gelatin-producing tissue, such as hide powder, bone and horn, has, of late, obtained the most general recognition in the estimation of tannic acid by the method known as that of Löwenthal. This method, which was found to be more convenient, expeditious and productive of uniformity as to results, having superseded the precipitation of tannic acid by means of isinglass or gelatin solutions, consists essentially in the titration of a tannic acid solution mixed with an indigo solution acidulated with sulphuric acid, by means of a solution of potassium permanganate standardized, either pure tannic acid or oxalic acid.

Aside from these reagents there is also a substance required which possesses the property of absorbing or withdrawing tannic acid from its solutions, in order to determine in the liquid, after the withdrawal of the tannic acid, the amount of other substances capable of oxidation by the permanganate solution, and designated simply by the name of non-tannins. The titre of the permanganate solution should be, according to Professor von Schroeder, of such strength that one cubic centimetre equals 0.001747 grams of tannic acid.

It is not within the province of the writer to enter into the details regarding the subject under consideration, as ample directions will be found touching the method of Löwenthal in a report from Dr. C. Cunceler in the transactions of a commission appointed to investigate critically and devise a uniform method for the determination of tannic acid.

The object of this paper is simply to draw the attention of chemists to a substance which is readily obtained and easily prepared, and is par excellence in every way a desirable substitute for the various gelatin-producing tissues at the present time in use. This substance, called American Isinglass, or occasionally ribbon isinglass, occurs in thin ribbons several feet long, and from an inch and a half to two inches in width. It is less soluble than the Russian. It is obtained from the air bladder of the common hake (*Gadus merluccius*). This is thrown into water to macerate for a little

while, and is then taken out and pressed between two iron rollers, by which it is elongated to the extent of half a yard or more.

In order to prepare this isinglass for the purpose here indicated, it is packed moderately firmly into a conical glass percolator, having its lower orifice corked, covered with distilled water and allowed to stand about twelve hours. Then the cork is removed and the water allowed to drain. The cork is then replaced, more water poured on to cover the isinglass, and the operation repeated about four times or more until the water that drains away is not affected on the addition of a solution of tannic acid. During the warm weather, or if the isinglass should acquire odor indicating putrefactive decomposition, the addition of about 10 per cent. of alcohol to the water will be necessary. The isinglass is then transferred to a muslin strainer, and strongly expressed in order to remove as much of the water as possible. The moist mass is then to be returned to the percolator covered with stronger alcohol, allowed to stand twelve hours, transferred to the strainer and again expressed. The cake of isinglass is finally spread out by picking it apart, and laid on glass or porcelain plates, and allowed to dry in a current of air.

It will be seen that the mode of preparing this isinglass for detannating solutions is an exceedingly simple process, standing strongly in contrast with the preparation of hide powder as directed by Professor von Schroeder. The main difficulty in reducing the purified and dried hide to the state of fine powder seems to be its toughness. Fresh depilated hide is to be kneaded repeatedly daily in running water for eight to ten days, or until the water fails to remove anything soluble in it. The hide having now become nearly white, is then to be cut up into squares of three to four millimetres, these dried on a water-bath at 100° C., and finally ground to a fine powder in a suitable mill. During the grinding, the hide will have to be kept drying at intervals on the water-bath, so as to enable it to be wholly ground up.

Where time is an object it will be seen that American isinglass should be greatly preferred, inasmuch as its preparation stands in the ratio of three days to twelve days for the hide powder. Also in the application of the former for detannating purposes its superiority is manifest. Professor von Schroeder directs 3 grams of the hide powder to be used for 50 cubic centimetres of a decoction of oak bark, having a strength of 2 grams in a litre. He covers

the hide powder with water, allows it to swell about twenty hours, and expresses the water through a wetted linen cloth. The moistened powder is then put into a glass flask holding 150 cubic centimetres, and 50 cubic centimetres of the decoction added, the whole vigorously shaken and allowed to stand from ten to twenty hours, with occasional shaking. It is then to be poured upon a dry filter, and of the filtrate 10 cubic centimetres are to be taken for the titration.

Of the isinglass as prepared by the writer, 1 gram appears to be sufficient for detannating 50 cubic centimetres of the decoction. The isinglass is added to 50 cubic centimetres of water contained in a flask of 150 cubic centimetres capacity, allowed to swell about fifteen minutes, and vigorously shaken. The violent agitation causes the isinglass to break up into a pulpy condition. It is then to be transferred to a muslin strainer, and as much water as possible squeezed out. The moist mass of isinglass is then transferred to the flask containing 50 cubic centimetres of the decoction of oak bark, and the whole well shaken for about fifteen minutes, when the decoction will be found to be detannated and ready; when filtered for titration, it will be seen that whilst by the use of hide powder it will require twenty hours to swell it, and twenty hours more to absorb the tannic acid, the same results will be obtained by the use of the isinglass in about half an hour. Prepared isinglass is, therefore, to be preferred, not only on account of the facility with which it is prepared and the expeditious way in which it absorbs tannic acid, but also its cheapness.

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## THE APOCYNACEÆ IN MATERIA MEDICA.<sup>1</sup>

BY GEORGE M. BERINGER.

GENERAL KNOWLEDGE OF THE FAMILY.

*Morphology.*—Very rarely herbaceous and in all cases perennial plants, the Apocynaceæ are trees, shrubs or woody climbers, and in

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<sup>1</sup> The material in this paper is abstracted from that valuable monograph recently issued, entitled "*Produits Fournis à la Matière Médicale par la Famille des Apocynées*", par Louis Planchon, Docteur en Médecine, Licencié és Sciences Naturelles, Pharmacien Supérieur, Chargé du Cours de Matière Médicale à L'École Supérieure de Pharmacie de Montpellier, Membre Correspondant

this case the twining is to the right, or they maintain themselves upon the trees without rolling about them. *Branches* often fleshy or thorny, always traversed as elsewhere in the entire plant by latiferous canals with a white juice, or more rarely opalescent. The subterranean parts, *roots*, or sometimes rhizomes, may be swollen with tubercles. In the same genus as the *Dipladenia*, D. C., for example, we find in the Campos of Brazil the plants herbaceous or suffruticose, often tubercular with erect branches (*Eudipladenia*), and in the region of the forests the long, twining climber (*liane*) elevating itself upon the tallest trees (*Micradenia*).

*Leaves*.—Opposite or verticillate, more rarely alternate, simple, the shape varying, but always entire and destitute of stipules, although sometimes a swelling—a pseudo-stipule—appears extending transversely between two opposite leaves, as in certain *Echites*, or various appendages (glands, scales, etc.) may remind us by their presence of stipules.

*Flowers*.—In cymes, rarely in racemes, sometimes solitary; regular, hermaphrodite, pentamerous. *Calyx*, of five sepals, bearing often on the interior, glands or scales quite analagous to those of the leaves. *Corolla*, regular, gamopetalous, with five lobes, æstivation twisted to the left or to the right. The corolla prolongs itself occasionally in long appendages, and bears frequently the *ligules* that are united thereto; these together constitute the crown, and which Duval studied under the name, not now used, *Lepals*. This exists more or less in size in a number of the Apocynaceæ. The odor is fragrant and strong, especially in the pure white flowers. Elsewhere, they are the same as the *Asclepiadaceæ*, *Jasmineæ*, *Loganiaceæ*, *Rubiaceæ*, and in general with the *Contortæ* of Linné.

*Andræcium*.—Always five stamens, alternate with the petals, and with the filaments separating from the corolla at various heights. *Anthers*, bilocular, introrse, with dehiscence longitudinal, sometimes adhering to the stigma; the *connective* very often enlarged, possibly prolonging itself into filaments more or less long. *Pollen* granular,

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National de la Sociétié de Pharmacie de France, Membre Correspondant du Philadelphia College of Pharmacy, Officier D'Académie, etc." Montpellier, 1894. Instead of the usual short review under the Bibliographical Notices, it has been deemed advisable to place before the American readers a translation of the more important points of this commendable work, and it is hoped that this will serve to extend its usefulness.

G. M. B.



with separate grains; it is this that distinguishes the Apocynaceæ and the Asclepiadeæ.

*Disk*.—Between the two interior cycles we find frequently a nectar-bearing disk, circular or five-lobed, or two large glands, or again a number of glandules. These organs are frequently aborted.

*Gynæcium*.—Always of two free *carpels*, rarely a little sunken, the receptacle developing slightly concave, and the insertion a small perigynium. The carpels sometimes distinct, at other times coherent on an ovary bilocular, or more rarely unilocular with parietal placentation. The distinct carpels often remain consolidated at the extremity with the base of the persistent style. The *styles* are at first free, then always united in a single one, frequently dilated at the disk, below the stigma, often bifid. The characters of the stigma are often important for distinguishing neighboring families. *Ovules*, ordinarily numerous, rather rarely two or one; semi-anatropous, anatropous or campylotropous.

*Fruit*, very various in shape and structure, and permits the division of the family into tribes; double follicle, capsule, berry, drupe, one or two locular. *Seeds*, ordinarily compressed, always of a certain shape, sometimes peltate, alated, or provided at one or both extremities with a tuft of hairs, or the awn sometimes greatly developed. *Albumen*, generally thin, existing nearly everywhere; cartilaginous or fleshy. *Embryo*, straight, with the radicle variously directed, with two cotyledons plane or folded or rolled up, often oily.

*ANATOMY*.—*Laticiferous vessels*.—It is often in the liquid which they contain that the active principle of the plant is found, and the species in which the latex does not gush forth in abundance with the least wound is here an exception. They are formed primitively by a small number of isolated cells, elongating themselves at the same time that the appendices of the plant, multiplying by innumerable ramifications, but these are not partitioned and do not anastomose. These are the *inarticulate laticiferous* vessels of Hartig. These appear already in the embryo. Chauveaud has shown the existence of these initial cells (4 rarely 8 or more) constant in number for each species, and placed in the tissue external to the central cylinder of the young embryo, in the pericycle. Once developed, the laticiferous vessels present quite a diversity in the organs, in certain species being infinitely richer than in others. Although their existence in the pericycle is quite constant, they

may be aborted in this or other regions. Sometimes larger than the neighboring cells, consequently easily seen and ordinarily on section ovoid or a little sinuous, at other times they are difficult to see because of their complete resemblance with the neighboring cells from which one may distinguish them in longitudinal section. The *walls* of these show a thin membrane like the neighboring parenchyma cells, the others a white membrane much more thick. The contents of these is sometimes granular and opaque, at other times transparent, or oleo-resinous and the consistence very thick, rich in caoutchouc. In the free state the aspect of the liquid is a white latex, rarely nearly clear. The wall is formed of pure cellulose, resisting the Amylobacter; this permits the separation of these vessels by maceration.

*Internal Liber.*—The ligneous fascicles are comprised between two liber zones, as in a great number of families. But here, contrary, to that which we find in the Cucubitaceæ, for example, the internal liber appears independent. It shows itself in the medullary region in scattered bundles, sometimes quite remote from the wood, while the external liber is immediately opposite to it. There is a great abundance in nearly all the tissues of calcium oxalate in two forms: rhombohedrons and macles,<sup>1</sup> sometimes in mass, at other times separate, and their localization is frequent along the sclerotic or fibrous elements.

*AFFINITIES.*—The single character, that is always constant in the Asclepiadaceæ, the cohesion of the pollen grains, serves to distinguish it from the Apocynaceæ. The latter likewise in certain characters approaches the Loganiaceæ, Rubiaceæ, Oleaceæ and even the Gentianaceæ.

*HISTORY.*—The European Apocynaceæ, Nerium and Vinca, are native and known in the most ancient times. Hasselquist supposes even that it was the Rose-Laurel, to which allusion is made in the first psalm of David. Dioscorides was acquainted with the Penenches and the Nerium, which Apuleius described under the name of Rose-Laurel. In *Arabia*, Avicenna distinguished two varieties, of which the one (woody and spiny), may be, according to Sprengel, was the

<sup>1</sup> Macles, according to Stormouth, "a term applied to 'twin-crystals,' which are united by simple contact of their faces by interpenetration, or by incorporation, these twin forms being often repeated so as to form groups."

*Nerium salicinum* Forsk, of Arabia. If we add that Avicenna wrote of a "tree of India poisonous and latex bearing, of which the thickened juice seems like Turbith," and in which we may possibly recognize (?) the *Cerbera manghas*, we have nearly all the knowledge that the ancients possessed upon the Apocynaceæ.

The first American Apocynaceæ described appears to be the *Thevetia peruviana*, of which Thevet wrote in 1558. In India, GARCIA AB. HORTO pointed out *Ophioxylon serpentium* and the *Carissa carandas*; D'ACOSTA the *Cerbera manghas*, and, in Europe, Lobel described the *Apocynum venetum*. Toward the close of the seventeenth century Rheede and Rumphius make known the numerous Apocynaceæ of India, while Plukenet, Plumier, etc., multiply the number of American species. During the whole of the last century the voyages of the naturalists accumulated the materials that Linné and his successors arranged. Already, Adanson, then A. L. De Jussieu, had reunited in one natural group the Apocynaceæ and the Asclepidaceæ. Finally, Robert Brown, at the commencement of this century, gave to the Apocynaceæ the limits generally accepted to this day. It is remarkable that the history of those which are of medical interest is entirely recent.

**GEOGRAPHIC DISTRIBUTION.**—Nearly all the Apocynaceæ are inter-tropical, and for the most part in the hottest regions; and beyond the tropics they diminish abruptly and are represented by only a few species: India, Malaysia, tropical America, the Antilles, Equatorial Africa, Madagascar, the Mascarene Islands, all offer numerous species. Australia and Oceanica contain less. M. F. von Mueller enumerates fifty in Australia. In Europe, in Asia (except the regions indicated), and in North America, are very few. The area of distribution is very variable for the same species; many species are localized in one point of the globe; many others, all neighbors, are common to all the tropical regions.

**USES AND PROPERTIES.**—In certain Apocynaceæ, the magnificent flowers are used in perfumery, especially in India. The hot-houses of Europe contain quite a number, remarkable for the beauty of their flowers or of their foliage. But the point of greatest interest here is the study of the medical properties of the group. A singular contrast is offered by the presence of inoffensive vegetables or comestibles in the midst of terrible poisons. Certain fruits of the Apocynaceæ often may be eaten with impunity, and the latex, ordinarily

so very rich in toxic substances, may, in some species, become a real food. Other plants assume the properties of simple bitters, astringents or febrifuges, while the latex of others is a powerful purgative. It is not the less certain that the general properties of the Apocynaceæ are a remarkable homogeneity, and that the immense majority of the species are suspected plants. Wherefore, it is even supposed these poisons are as terrible as the Strychnos, their neighbors. In these the action is purely irritant, corrosive, drastic, or emeto-cathartic; in others, exist principles, sometimes isolated already, more frequently yet unknown, and which act energetically upon the heart or upon the nerve system. Many of this class are glucosides and joined more or less with the group Digitalines. Their localization is various; sometimes in the whole plant, at other times in the seed, the pericarp, the bark, the wood, etc. It happens even, rarely it is true, that the latex and the fruit, for example, have properties entirely different.

#### FRUITS AND SEEDS.

Those treated are here classified as follows:

(1) The fruits with a dry pericarp (*Strophanthus*, *Holarrhena*, *Wrightia*). It is here the seeds that we employ in medicine.

(2) The fruits with a fleshy pericarp. The poisonous ones (*Tanghina*, *Cerbera*, etc.), the more frequently, especially in their kernel. The others, to the contrary, are aliments (*divers*, *Carissa*, *Melodinus*, etc.), nearly always in the pericarp.

FRUITS WITH A DRY PERICARP.—We distinguish in these fruits: the group *Strophanthus*, of which the medicinal species are African; and those of the *Holarrhena* and *Wrightia* employed almost only in India.

#### THE STROPHANTHUS.

From the Greek *strophos* cord, *anthos* a flower. The enrolled aspect of the lobes of the corolla, which in certain species are twisted before the florescence like a bit of cord with five elements, is the character upon which the name of the genus was founded by A. P. DeCaudolle, in 1802. The genus then contained but four species. In the recent monograph on this genus by M. Franchet, 1894, he describes thirty-five species, and lays aside as insufficiently known botanically *Strophanthus minor* and *S. asper*, but these are important in materia medica. The memoirs of Alph. DeCandolle

(1844) described eleven species; Reber (1887) 18; Pax (1892), 25; Holmes (1892), 28. It must be admitted that their number is not definitely fixed.

(To be continued.)

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## CACAO STARCH.

*Editor of the AMERICAN JOURNAL OF PHARMACY:*

DEAR SIR:—Anent the article on cacao starch, by Professor Bastin, you expressed the hope that a method of distinguishing (or rather, recognizing) the addition of other starches, respectively, flours, would soon be discovered.

Allow me to point out that the relative size of the starch granules should form a good distinguishing mark, none of the commercially available starches being as diminutive as those of cacao.

Marmé gives the size as 0.005 millimeter, while rice and corn starch have 0.005 to 0.008 and 0.015 to 0.03 millimeter, respectively. From the size, rice starch might be mistaken for cacao starch, but rice starch is always angular, cacao starch never (or merely here and there).

In order to make an adulteration with any kind of starch or flour pay, the addition cannot well be less than 20 to 25 per cent.; besides, the adulterant has to be cheap, which would exclude sundry starches.

Yours respectfully,

HANS M. WILDER.

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## STERILIZATION OF THE SOLUTION OF MORPHINE CHLORIDE.

A. Berlioz (*Jour. de Pharm. et de Chim.* [5] 29, 410), has found unaccountably sudden changes in his solution of morphine chloride during sterilization. After a number of experiments and observations, he has determined that the alkali of the glass is often the cause of the difficulty. He believes to be successful one should use a glass which yields the least trace of alkali, and also a temperature not quite 110° should be employed. As soon as this temperature is reached the darkening takes place very rapidly. When the alteration commences to take place in the cold, and the glass is not alkaline, then the difficulty probably lies in the impurity of the morphine salt.

## EDITORIAL.

The paper in this issue on the "Structure of Podophyllum," is intended to be the first of a series of illustrated articles by Professor Bastin on our indigenous drugs. We hope to have one of these contributions every month, but that cannot be definitely promised, since the very nature of the work precludes absolute regularity.

While illustrations of foreign drugs are to be found in every text-book on the subject, the medicinal plants of our own country have not been so exhaustively treated.

We trust that these illustrations and descriptions will be appreciated by students and others in this country, as we are sure they will be by our foreign readers.

With an abundance of raw material at his disposal, and with the unusual facilities which he possesses, we feel that no one is better adapted to take up this long-neglected subject than Professor Bastin; and we anticipate that he will give us a vegetable histology of our own country, which will not only be of present interest, but will at the same time be of permanent value.

## THE BRITISH PHARMACEUTICAL CONFERENCE.

The recent Conference at Oxford, England, appears to have been one of unusual interest.

The president, N. H. Martin, severely criticized the pharmacists for giving too much weight to the business side of their profession, and little or no consideration to those scientific matters which go to make their calling a profession. "Pharmacy," he declared, "as a trade is a failure."

As a remedy he advocated more severe preliminary examination of apprentices, followed by a longer course of study than is now required.

Leaving the pharmacist, he vigorously denounced the medical profession for listening to the advice of the enterprising manufacturers, who impose on the gullible physician such imaginary preparations as "skinnaline, containing the active principles of the skin," and "liq. curaline co.," which will cure all ailments, etc.

Many of the papers presented were of a high order of merit; almost all of them bore evidence of original research on subjects of a chemical or pharmaceutical nature. There was a marked absence of that class of papers frequently presented in the American Association, which are often merely rambling theories about the profession of pharmacy, pharmacy laws, boards of pharmacy, pharmaceutical education, etc.

## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*Companion to the latest edition of the British Pharmacopœia.*—Comparing the strength of its various preparations with those of the United States and other foreign Pharmacopœias, to which are added not official preparations, and practical hints on prescribing.

By Peter Squire. Sixteenth edition. Revised by Peter Wyatt Squire and Alfred Herbert Squire. London: J. and A. Churchill, 1894. Pp. 693.

Since the publication of the fifteenth edition in 1890, the authors, with a

staff of experimenters, have devoted their time to the collection of information from various sources and to experimental work. Comparative experiments have also been made with pill excipients.

The comparisons with foreign Pharmacopœias have been revised with the following new editions: Danish, 1893; German, 1890; Russian, 1891; Swiss, 1893; United States, 1893. The new Italian Pharmacopœia has also been added to the list, which now numbers fifteen. The subject-matter has been enlarged by 120 pages; these additions are pretty evenly distributed through the book.

That portion relating to excipients for pills will bear repetition as follows: "Excipients for pills are of two kinds: (1) Those which are more or less fluid and employed to bind together powders, or to impart the necessary moisture to adhesive substances; (2) those, generally in powder, which are intended to absorb moisture and give solidity to the mass. Of the former, 'Dispensing Syrup' (equal volumes of glycerin, syrup and mucilage) and glucose are most in request; proof spirit also is very useful. Glycerin by itself is distinctly inferior to the foregoing. Glycerin of tragacanth is much employed, but in the majority of cases where it would be used, we prefer glucose, either by itself or mixed with an equal weight of syrup.

"Of the powders, that of liquorice root is most useful when moisture is to be absorbed and no binding power required. An unexpected exception is the case of carbolic acid, which makes a very good plastic mass with twice its weight of liquorice powder (when well worked together, the result is very satisfactory).

"When more plasticity is required, the absorbent powder is supplemented with compound tragacanth powder, or powdered gum acacia. For essential oils this condition is best obtained by the use of powdered curd soap; as a rule, one minim of the oil will require half a grain of the soap and two grains of the liquorice.

"A mixture of paraffins (*massa paraffinum*), without or with kaolin (*massa kaolin*), is used for substances which are readily reduced by organic matter, such as the permanganates and the salts of gold and silver.

"It 'goes without saying' that an excipient must not be chemically incompatible with the other ingredients, but there is not much opportunity for such an occurrence with those above selected."

We further learn that in making *Liquor Plumbi Subacetalis*, "digestion in the cold for a week answers equally well, if not better, than the half hour's boiling."

The book is interesting, not only to those working with the British Pharmacopœia, but almost equally to those using any Pharmacopœia; for instance, under opium we are able to read at a glance the morphine requirements of fifteen Pharmacopœias, besides that of Great Britain.

Coming as it does during the revision of the British Pharmacopœia, it will be of great value to those engaged on this latter work.

*Produits fournis a la matiere medicale par la famille des Apocynées.* Par Louis Planchon. Montpellier. 1894. Pp. 364.

This interesting and valuable monograph is reviewed more in detail on page 449.

*Lessons in Qualitative and Volumetric Chemical Analysis.* By Dr. Charles O. Curtman. Including *Lessons in Qualitative Chemical Analysis*, by Dr. F. Beilstein. Fourth edition. St. Louis, Mo. John L. Boland Book and Stationery Company. 1894. Pp. 295.

The first edition of this work was a small volume of 154 pages, issued as "Beilstein's Chemical Analysis," and was to a great extent a translation. The author has since made a great stride in adapting the book to the uses of the American student and pharmacist. As now perfected it is a complete work on qualitative and volumetric analysis. While the qualitative portion is in part a translation, the volumetric part bears evidence of being the fruit of the author's own ripe experience.

Among the notable features of this edition are: a section on the examination of drinking water, which has been recast from the previous edition so as to embody the recent advances made in this important field of hygienic investigation; a section on urine analysis, which has been largely rewritten, and copious additions to the section on volumetric analysis, so that it now forms a complete commentary on the volumetric assays of the last revision of the U. S. Pharmacopœia.

The author has adopted the orthography to conform to the rules of the chemical section of the American Association for the Advancement of Science. While we are not prepared to condemn this method of spelling chemical terms, we are inclined to the belief that the authors of pharmaceutical text-books should make them conform to the Pharmacopœia.

*Proceedings of the Connecticut Pharmaceutical Association*, at the eighteenth annual meeting, held at Hartford, Conn., February 6 and 7, 1894.

The feature of this number is the "Report on Progress of Pharmacy," by A. Felton Wood. The secretary is Frederic Wilcox, Waterbury, Conn.

*The Medicinal Plants of Tennessee.*—Arranged and published under the direction of T. F. P. Allison, Commissioner of Agriculture, by A. Gatterger, M.D., Nashville, Tenn. 1894. Pp. 128. The commercial values of the plants receive considerable attention, and the part of each plant employed is stated, as well as the best time of year for collection. A tabular statement is made of the prices paid to collectors, which cannot but be of value to those contemplating a trial at this business.

The author, in his preface, gives a few instances of practical field work of the character this book is intended to introduce and encourage, among them being the following: Three miles from the eastern limits of the city of Nashville grows abundantly Sweet Cicily (*Osmorrhiza longistylis*), in moist copses and shady groves. The root, which may be quickly lifted from the loose leaf-mould in which it luxuriates, is quoted at 18 cents a pound, twenty-five or thirty roots making a pound, and several hundred roots could be collected in a few hours. To the right and left of the Lebanon Pike stands any number of a two-foot high, homely weed, White Vervain (*Verbena urticæfolia*). The root of this plant brings 8 cents per pound. It can be pulled out of the ground by taking hold of the stem. Wintergreen (*Gaultheria procumbens*) often covers whole mountain sides in a dense sward. It may be cut with a scythe, dries easily, weighs rather heavily, and sells for 4½ cents a pound. It pays well for the labor of cutting and baling it. On the summits of the Bald and Smoky



Mountains, in East Tennessee, the tiny Goldenthread (*Coptis trifolia*) covers the ground, often imbedded in the moss, whence it can be gathered with the fingers. The whole plant, root and top, is quoted at 25 cents per pound, and the supply is unlimited. The Hop-tree (*Ptelea trifoliata*), and the Canadian sumach (*Rhus Canadensis*), abound in the glades of Middle and West Tennessee; they are shunned by cattle and sheep, and serve only the purpose of shading the ground. The bark of the root of the former brings 15 cents, and of the latter 9 cents per pound.

This book will be furnished free to citizens of the State who desire to make practical use of the information it contains, but has not been published for indiscriminate distribution. Persons living outside of the State can obtain copies in paper binding at 50 cents, and in cloth binding at 75 cents, by addressing Franc. M. Paul, 309 North Market Street, Nashville, Tenn.

*One Hundred Years of Business Life.* 1798-1894. W. H. Schieffelin & Co. New York.

A very neat, attractive and, what is more, interesting souvenir, has been issued by the above firm. Its scope cannot be better explained than by quoting the "Prefatory Note:" "The year 1894 completes a century of existence for the house of W. H. Schieffelin & Co. They are naturally induced to emphasize the fact, and therefore have determined to make it the occasion of offering to their friends a greeting in the form of a pamphlet, which is intended to set forth the historical as well as commercial significance of this exceptional circumstance.

"Six changes in the composition and name of the firm occur, which suggest convenient periods into which to divide the following story of American business life."

"Lawrence & Schieffelin, 1794-1799.

"Jacob Schieffelin, 1799-1805.

"Jacob Schieffelin & Son, 1805-1814.

"H. H. Schieffelin & Co., 1814-1849.

"Schieffelin Brothers & Co., 1849-1865.

"W. H. Schieffelin & Co., 1865-1894."

The history of the United States, readily interwoven with that of the firm and interspersed with numerous well-executed illustrations, occupies fifty pages of the pamphlet. The remaining six pages, as an appendix, are devoted to a concise history of "One Hundred Years of Chemistry and Pharmacy." It is not sufficient to say that this is a creditable publication; we must rather say that it should have a permanent place among the historical records of our country.

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## PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

### THE BRITISH PHARMACEUTICAL CONFERENCE.

The opening exercises of the Conference took place at Oxford, England, July 31, 1894. We are indebted for the following information concerning the proceedings, to the *Pharmaceutical Journal and Transactions*, and the *Chemist and Druggist*; the editor of the former kindly supplied us with the advance proof sheets of the president's address.

The Conference was welcomed by Dr. Caird, Master of Balliol College, Walter Gray, Esq., Mayor of Oxford, and Sir Henry Ackland, Bart., K.C.B. (Regius Professor of Medicine of the University of Oxford). The last speaker considered that the whole question of medical science, and along with it the question of scientific pharmacy, was undergoing a change as well as a course of progress and enlargement which the world had never seen before. It depended upon various causes—it depended upon the progress of biology, on the broad views taken of the whole nature of life on our planet, and especially upon the fact that attention was being given throughout the whole world, not really so much to the treatment of disease as to the prevention of it.

The President, Mr. N. H. Martin, selected "Medicine and Pharmacy" as the subject of his address. This he considered sufficiently broad to allow him to speak as candidly of British pharmacists and pharmacy as he did some months ago, in another place, of their American congeners.

In answer to the question whether the condition of pharmacy in its own special domain is satisfactory at the present time, he was compelled to speak in the negative; but, he argued, this is in a very great measure due to certain peculiar directions in which the trade in medicines has developed in recent years, and the Pharmaceutical Society is most certainly in no degree to blame for the present condition of affairs. It is rather registered chemists and druggists who are to blame, for endorsing the falsehoods of advertising quacks and helping to create on the part of the public an unhealthy demand for proprietary medicines. The manner in which medical practitioners are inveigled into recommending and prescribing quack remedies was also forcibly declaimed against.

It is impossible, it was pointed out, in the practice of pharmacy, to grasp commercial advantages and yet retain the rewards properly belonging to professional services, and pharmacy must shortly make its choice between the two. The very essence of trade is that it is capable of indefinite expansion, and there is no limit to which a tradesman may sell his goods through the agency of others. But indefinite expansion is impossible in the fulfilment of the proper functions of pharmacy, which stamp it as a profession rather than a trade, requiring the members to receive a special education and give evidence before a legally constituted body that they have been so educated. The service rendered also is personal and direct.

Pharmacy as a trade is a failure, and rightly so, as nothing can justify the use of professional knowledge to excite men's fears and play upon human credulity for gain.

Regarding the steps which should be taken to enable pharmacy to realize its privilege and accept its responsibilities as a profession, it was recommended that the entrance examination should be made a more stringent test of intellectual powers and school training. Algebra, geometry, history, geography, and a modern language should be included in the syllabus, and an extended knowledge of Latin should be required. This entrance examination should not be passed before the age of seventeen, and should be followed by a three years' actual apprenticeship. An enforced curriculum covering two years should then precede the qualifying examination, lasting a week or more, and success in this should carry with it the qualification and title of pharmacist.

The president's address having been concluded, he received a unanimous vote of thanks.

Reports of the secretary and treasurer followed, and then the report of the Formulary Committee was read. Four new formulas have been added to the new edition just published, viz.: "Collodium Stypticum," "Extractum Belladonnæ Folii Alcoholicum," "Liquor Bromo-chloral Compositus," and "Syrupus Acidi Hydriodici." Other alterations consist chiefly in lessening the acidity of certain syrups, and in an improved formula for "Collodium Belladonnæ," which is now directed to be made from a solid alcoholic extract of belladonna leaf, assayed at the time it is used so as to obtain a uniform product, instead of from a liquid extract.

The following papers were then read :

*Note on the Stability of the Alkaloidal Tinctures.* By E. H. Farr and R. Wright.

The authors examined a number of tinctures which had been kept for twelve months to three years, and their conclusions were that no appreciable change in the alkaloidal value of tinctures takes place on standing; unimportant exceptions occurred with the tinctures of veratrum and cinchona, but the average loss in the most extreme case did not exceed 5 per cent.

The same authors presented another paper on the *Gravimetric and Volumetric Methods for the Determination of the Alkaloids in Alkaloidal Tinctures*, in which they reverted to the paper of Caspari and Dohme, read before the American Pharmaceutical Association last year, who advocated volumetric methods. The present authors, however, showed that with aconite and colchicum the volumetric methods are absolutely worthless, while they are unsatisfactory with cinchona and veratrum. In conclusion, it was maintained that the results yielded by gravimetric methods are, if anything, the more reliable of the two.

*The Qualities of a Typical Dentifrice* was the subject of a paper, by Arthur Turner. As a mechanical base chalk, "prepared" rather than "precipitated," is preferable to pumice; the latter may scratch and injure the enamel. No base should be used that will scratch silver. Charcoal and astringents are objectionable for various reasons. A little sodium bicarbonate should be added, and the flavoring should be oil of cinnamon, which also possesses valuable antiseptic properties.

*A New and More Economical Process for Extractum Nucis Vomice* was offered by E. W. Lucas, who recommended a dry extract instead of the present liquid one of the Br. P.

*Note on Strychnos Ignatia*, by F. Ransom. *Remarks on Gnetum*, by W. Elborne. *The Recovery of Residual Tinctures from Marcs*, and the Pharmacopœial instructions for the *Preparation of Tinctures*, by R. H. Parker, concluded the proceedings of the first day.

On the second day, Wednesday, August 1st, F. C. J. Bird led by reading "Some Laboratory Notes."

In addition to several practical suggestions, he favored the more extended adoption by the Br. P. of the process of repercolation, especially in the preparation of resin of podophyllum.

*Note on Extract of Malt with Cod Liver Oil, and The Keeping Qualities of Certain Samples of Spirit of Nitrous Ether*, were two papers by Henry William Jones.

With a view to rendering the natural features of the district more intelligible to visitors, G. C. Druce next gave some brief descriptive *Notes on the Geology, Botany and River Systems of Oxford and its Neighborhood*. An instructive paper was then read on *Animal Extracts*, by C. E. Stuart. *An Examination of Leonurus Cardiaca*, was the subject of a paper by W. A. H. Naylor. The drug for this analysis was grown and supplied by E. M. Holmes, who at the same time supplied some interesting information concerning it.

S. Rideal contributed a paper on *The Conditions of Papain Digestion*. Compared with pepsin under identical conditions, papain seemed to give the better results with meat fibrin, but with regard to egg albumen its digestive power appeared intermediate between that of two pepsins examined.

C. J. S. Thompson recommended the use of *Cocoonut Stearin as a Basis for Suppositories*. When mixed with white wax in the proportion of four ounces of the stearin to 340 grains of the wax, the author had found that it furnished a mass melting at 98° F., and becoming solid at 64° F. Its advantages over theobroma butter appear to be in its keeping qualities, and in its solidifying more rapidly.

R. H. Parker read a *Note on Phosphorus Pills*. The quantity of phosphorus necessary for 24 pills is dissolved in 30 minims of carbon disulphide, and the solution poured on 24 grains of liquorice powder in a mortar, and stirred with a spatula until the solvent is nearly dissipated, when sufficient syrup, glycerin and tragacanth powder are added to form a pill mass. *The Nomenclature of Official Remedies* was the subject of a paper by Joseph Ince.

Richard Usher read a paper on *English Medicinal Rhubarb and Henbane*, in which the methods of cultivating these drugs in England were discussed and explained. *Tinctura Ergotæ Ammoniata* was treated in a paper by J. T. Hornblower. A communication on *Rhubarb* was presented by Barnard S. Proctor. He had been investigating this drug at intervals since 1868. The odorous principle of the root he found was capable of being extracted by percolation with chloroform, without detracting from the medicinal value of the powder; but it was found that the deodorized powder acquired smell again, apparently by the action of air and moisture. When chrysophanic acid has been removed from the powder by percolation with benzol, a further development of the acid takes place on submitting the exhausted powder to the action of air, water and potassium hydrate.

*The Adaptation of the Soap Basis of Linimentum Potassii Iodidi cum Sapone to some other Br. P. Liniments*, was suggested in a communication by E. W. Lucas. J. F. Liverseege presented papers on *Tincture of Iodine and its Analysis*, and *The Calibration of Pipettes*.

*Some Fallacies in the Testing of Essence of Lemon* were explained by Arthur A. Barrett, of Messina. Finally a paper was presented from David Hooper on *Extract of Indian Hemp*. The author gave a brief review of the history of the plant, and called attention particularly to the extract as containing the active principle of the drug.

Following this, he described the best method of preparing the extract, gave some interesting facts concerning the composition of the extract, and added some results obtained by an examination of commercial extracts.

President N. H. Martin was elected to serve another year, and the Conference decided to hold the meeting of 1895 at Bournemouth.

#### PENNSYLVANIA PHARMACEUTICAL EXAMINING BOARD.

At the recent meeting of the State Pharmaceutical Examining Board, held at Williamsport, Pa., July 14th, 78 persons appeared for examination as Registered Pharmacists, and 29 as Qualified Assistants—a total of 107. Of this number, 17 passed successful examinations as Registered Pharmacists, and 14 as Qualified Assistants—a total of 31. The next meeting of the Board for the examination of applicants for registration will be held at Philadelphia and Pittsburg (date not yet determined). All applicants for examination should apply to the Secretary, Charles T. George, 1306 North Third Street, Harrisburg, Pa., not later than October 1st, for examination blanks, and exact time and place of next meeting.

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### OBITUARY.

C. R. Alder Wright, B. Sc., D. Sc., F. R. S., of London, England, died July 25, 1894. The *Chemical News*, of August 3d, contains the following information concerning the deceased :

"No English chemist has covered so much ground. His work began with a paper published in February, 1866, in the *Journal of the Chemical Society*, on the *Action of Light on Sensitive Photographic Papers*, when Wright was a student at Owens' College, Manchester. Leaving Owens' College, he entered the Weston Works of the Runcom Soap and Alkali Company, as chemist.

"In August, 1867, we find a valuable paper in the *Journal of the Chemical Society*, in which Dr. Wright describes his experiences in alkali works.

"His work comprises investigations of simple substances like hydriodic acid, and some of the most complex substances, like the vegeto-alkaloids, upon which he labored for many years—sometimes alone and sometimes in conjunction with Mathiesson and others.

"Alder Wright was a mathematician as well as a chemist, and we find nine papers *On the Determination of Chemical Affinity in Terms of Electromotive Force*. These papers alone occupy a thick volume. They appeared for the most part in the *Philosophical Magazine*.

"In the *Journal of the Chemical Society* for February, 1873, there is a paper *On the Hydrogen Occluded by Palladium*, by W. Chandler Roberts and C. R. A. Wright. A series of papers then follows on *Isomeric Terpenes*, *Essential Oils*, etc., in the same year.

"On Friday, March 13, 1874, Wright delivered an evening lecture at the Royal Institution *On the Chemical Changes Accompanying the Smelting of Iron in the Blast Furnace*, embodying extensive experience he had gained in the works and research laboratory of Sir Lowthian Bell.

"In the *Journal of the Chemical Society*, January, 1878, appeared his first paper, entitled *Researches on Some Points in Chemical Dynamics*. The fourth of these papers appeared in December, 1880.

"His voluminous and valuable work on 'Ternary Alloys' was communicated to the Royal Society during the years 1889 and 1892.

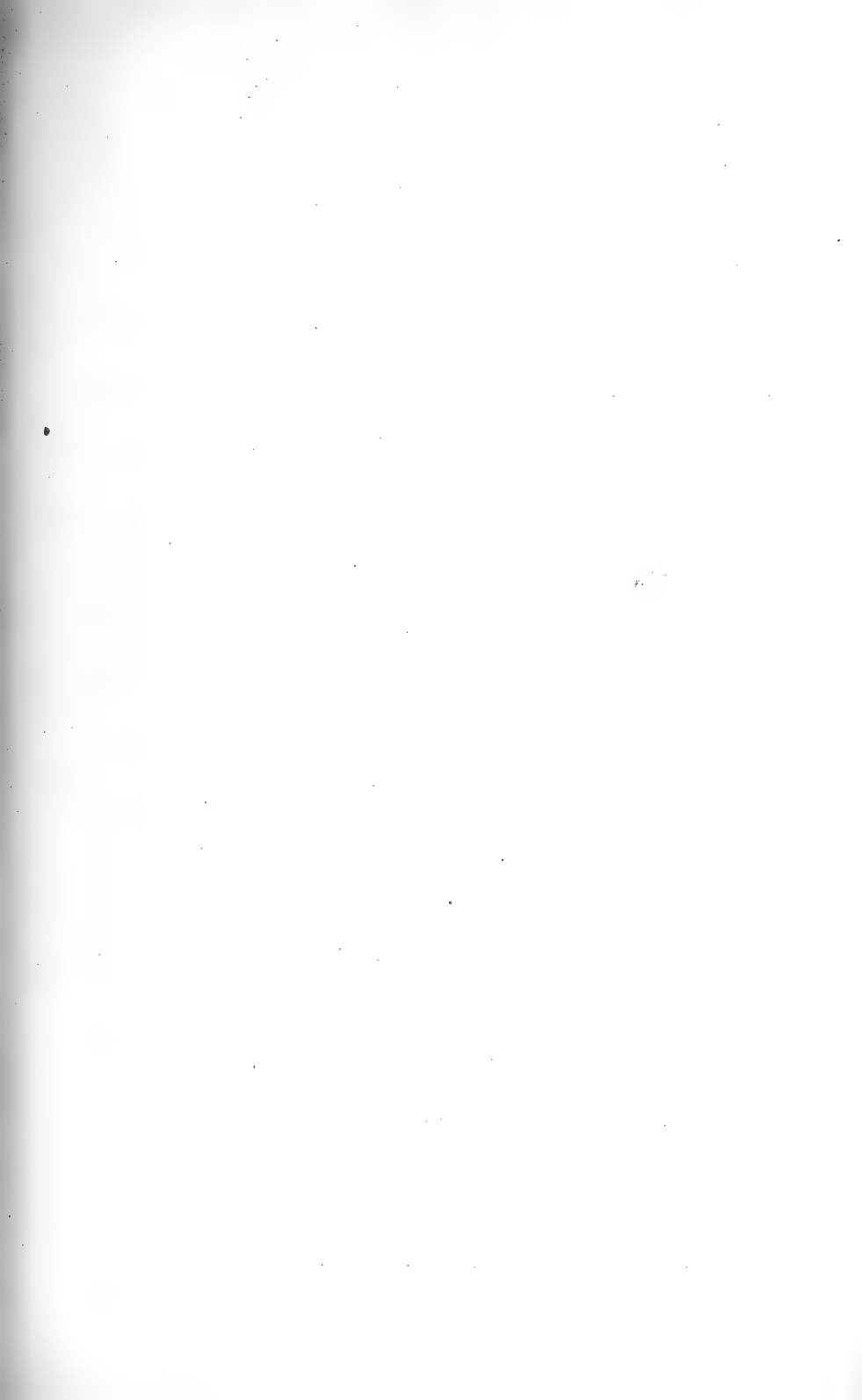
"During the last week or two, his health had been failing through an attack of diabetes mellitus, but no consequences of serious import were anticipated, until Monday, July 23d. On Wednesday morning he became comatose, and never recovered consciousness, death occurring early in the afternoon of that day."

In addition to the above, may be mentioned the recent volume of Dr. Wright on *Fats, Oils and Waxes*, which is a standard authority on these substances.

He was elected a corresponding member of the Philadelphia College of Pharmacy in March, 1893.

Dr. Clarence H. Risk, Ph.G., Class of 1876, died at the residence of his brother, Summit, N. J., July 3, 1894, of heart failure, aged 45 years, 5 months and 12 days. He was born at Lewisburg, Pa., January 21, 1849. He received his early education at Muncy and Carlisle, Pa., and attended a private school at Princeton, N. J., and from there he went to Lafayette College for two years, after which he learned the drug business with Risk and Mason, in Philadelphia, and graduated from the Philadelphia College of Pharmacy in 1876. After his graduation in pharmacy he attended the University of Pennsylvania and graduated as a physician from that institution in 1878. After his graduation in medicine he was in the drug business at Nineteenth and Berks Streets, and in 1879 removed to Baltimore, Md., and was in the drug business at Charles and Reed Streets, where he continued until 1885, when he sold out his business and travelled in South America and Europe, returning to this country in 1887, and entered the Bridgeport Hospital as resident physician for about one year. His health failing him, he gave up practice and he was not in active business at the time of his decease.

*Felix Anthony Lyneman*, Ph.G., Class of 1877, died suddenly in Denver, Col., June 19, 1894, from apoplexy. He had been in his usual good health, except complaining of a slight headache and pain in his left side, which caused neither him nor his family any alarm. Before dressing to go down-stairs to his breakfast, he entered the bath-room and was found shortly afterward by his wife, unconscious, and lived only a few hours afterward. He was thirty-seven years of age, and was a native of Richmond, Va., and was born of German Catholic parents. He learned the drug business and graduated from the Philadelphia College of Pharmacy in 1877. He was a member of the Alumni Association and of the American Pharmaceutical Association. He was also a member of the Colorado Pharmaceutical Association, and was its Secretary from its organization, having been re-elected twice to the office. At the time of his decease, he was the proprietor of two pharmacies in Denver, and was one of the most kind-hearted and genial of men, well liked by all who knew him, as was shown by his fellow-druggists, who attended the funeral in a body.





*GERARD TROOST.*





# THE AMERICAN JOURNAL OF PHARMACY

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OCTOBER, 1894.

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## A HISTORICAL SKETCH OF GERARD TROOST.

BY JOSEPH W. ENGLAND.

Historian of the Philadelphia College of Pharmacy.

An interesting historical sketch of Gerard Troost, first professor of chemistry in the Philadelphia College of Pharmacy, and first president of the Academy of Natural Sciences, of this city, has appeared in the June issue of the *Popular Science Monthly* (p. 258). Along with the sketch there is given a frontispiece of Dr. Troost, which represents him at a much later period in life than the accompanying portrait to this article, which has been taken from the oil painting in the Museum of the Philadelphia College of Pharmacy. The life of Gerard Troost was an eventful one. Born at Bois-le-duc, Holland, on March 5, 1776, he died in Nashville, Tenn., August 14, 1850. In early life, he attended the Universities of Leyden and Amsterdam, receiving the degree of doctor of medicine from the former, and master in pharmacy from the latter, in 1801. He practised for a while in Amsterdam and The Hague, served in the army, first as a soldier and then as an officer in the medical department, went to Paris in 1807 under the patronage of Louis Napoleon, King of Holland, and became the pupil and associate of the Abbé René Just Haüy, author of the famous system of crystallography. He then travelled in France, Italy, Germany and Switzerland, and collected a valuable cabinet of minerals, which was purchased by the King of Holland. In 1809, this king appointed Troost to accompany, in a scientific capacity, a naval expedition to

Java. The vessel in which he sailed was captured by an English privateer; he was confined for a time at Dunkirk, returned to Paris, and then made his way to La Rochelle. He took passage from a northern port beyond French jurisdiction, in an American vessel for New York, whence he hoped to reach the East Indies under the protection of our flag. The vessel was captured by a French privateer and taken to Dunkirk, where Troost was kept a prisoner until the French became aware of his true name and character, when he was released. He went at once to Paris, and in March, 1810, was elected a correspondent of the Museum of Natural History, of Paris. A few days afterwards, he embarked on an American vessel for Philadelphia.

The turn of affairs political in Europe, among which was the abdication of Louis Napoleon as King of Holland, and the surrender of Java to England, caused him to abandon his contemplated visit to the East Indies, and to remain in the United States.

In 1812, Dr. Troost participated in the meeting held January 25, in the house of John Speakman, apothecary, which resulted in the formation of the Academy of Natural Sciences, of Philadelphia. During his residence in this city, Dr. Troost was engaged in manufactures of various kinds. In 1815 or 1816, he began the manufacture of alum on the Magothy River, Cape Sable, Md., establishing the first alum works in the United States. In 1821, he was appointed professor of mineralogy in the Philadelphia Museum, and was made first professor of chemistry in the Philadelphia College of Pharmacy, from which latter position he resigned in 1822. He was the seventy-first member of the College, joining November 19, 1821, and resigning in 1822. During this period, he also made geological excursions into New Jersey and elsewhere, and it was to geological studies that he now bent all his energies. Removing first to Harmony, Ind., in 1825, and then to Nashville, Tenn., in 1827, he was elected in the following year, professor of chemistry, geology and mineralogy of the University of Nashville, and held this position for over twenty-two years. Here his life's best work was done, and his reports as State Geologist contributed not a little to an accurate knowledge of the rich mineral resources of the State of Tennessee.

## STRUCTURE OF HEUCHERA AMERICANA.

BY EDSON S. BASTIN.

The plant is botanically described as follows : Perennial, herbaceous, the above-ground parts from a short thick, knotty rhizome (*Fig. 1*), which usually gives rise to several heads and numerous conical or somewhat fusiform, branching roots ; scapes usually one from each

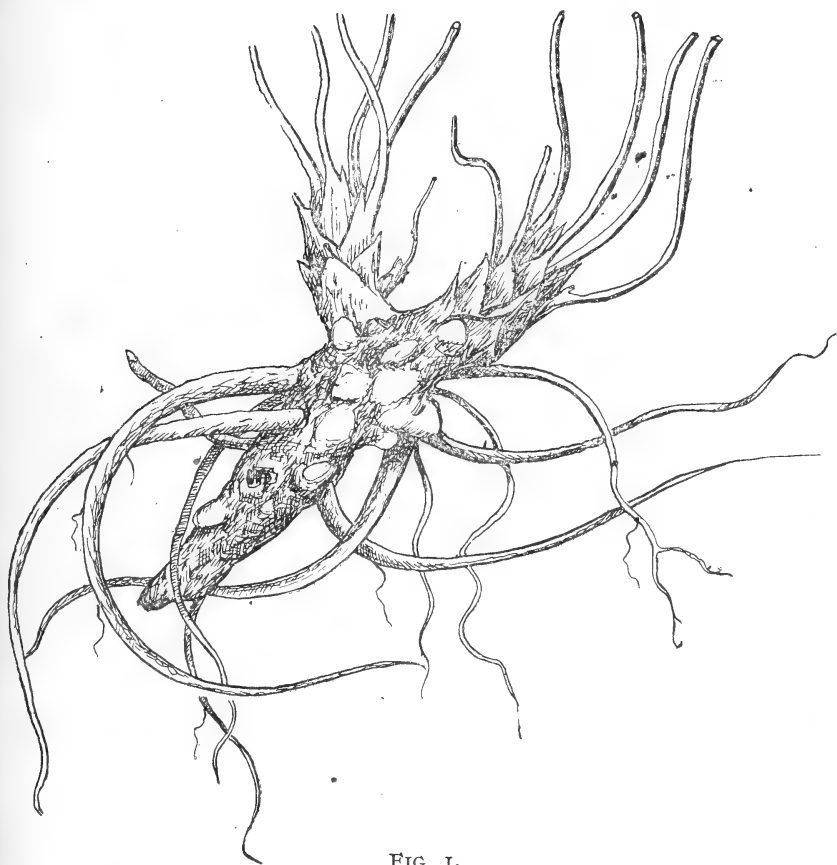


FIG. 1.

head, 2 or 3 ft. high, glandular and more or less hirsute with short hairs and bearing loose panicles of small, dull-colored flowers; leaves radical, long-petiolate, stipulate and with orbicular or broadly ovate, deeply cordate and bicrenate-margined blades which are more or less hirsute with short hairs ; stipules adnate to the base of the petioles and the free portions inconspicuous, scarcely green ; petioles cylindrical,

from 4 to 6 inches long ; lamina  $2\frac{1}{2}$  to 3 in. long by  $2\frac{1}{4}$  to  $2\frac{1}{2}$  in. wide, membranous in texture and palmi-reticulate ; flowers with a campanulate, regular calyx, whose base adheres to the base of the ovary and whose margin is five-cleft ; petals small spatulate, entire, white, not longer than the calyx lobes, and alternating with them,

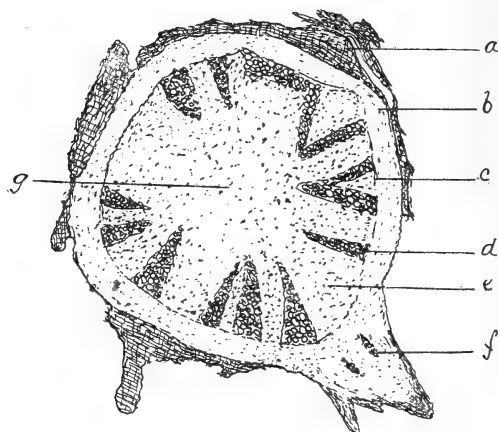


FIG. 2.

being borne on the disk which lines the calyx-tube ; stamens five, exserted alternate with the petals ; styles two, filiform and also exserted ; ovary one-celled with two marginal placentæ ; fruit a one-celled, two-beaked capsule dehiscing longitudinally between the beaks ; and seeds, numerous, small, oval, anatropous, with a roughened testa, albuminous, and with an axile embryo.

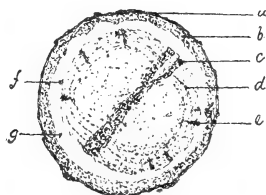


FIG. 3.

The plant is not uncommon in rocky wooded regions from Connecticut to North Carolina, and as far west as Minnesota and Illinois. By reason of the powerfully astringent properties of the root the latter is popularly called Alum Root. It has been much used by the Indians, and more or less in domestic practice, in medicine

as an astringent, and it doubtless merits the reputation it has acquired as a remedy for diarrhœa, aphthæ, menorrhagia, and for other disorders for which purely astringent remedies are employed.

The rhizome is fleshy, one-half or three-fourths of an inch thick, tuberculate, and often pitted, from two to four or five inches long, giving origin on its upper surface and sides to several short heads which are cylindrical, scaly from the numerous remaining leaf-bases, and often terminated by a concave stem-scar; from the sides and lower surface of the rhizome are emitted numerous roots, many of which are thin, but some of which may in the fresh state be as much as one-third of an inch in diameter.

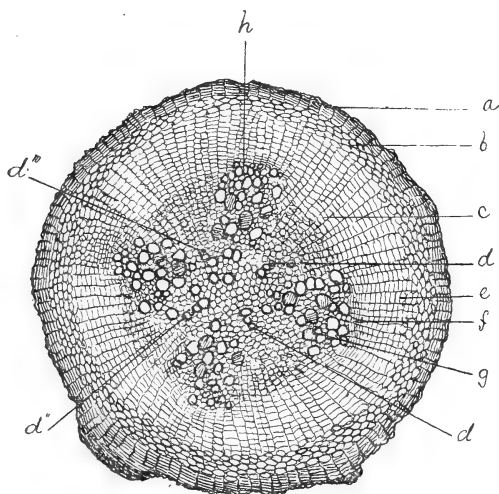


FIG. 4.

A cross-section of the rhizome shows a structure which is represented magnified about six diameters in *Fig. 2*. At the outside is a corky layer which is rough and unequal in thickness from peeling away at the surface; interior to this at *b* is a rather thin bark composed wholly of soft tissues, and then a large central cylinder with a few wedge-shaped radiating xylem masses arranged at irregular distances apart but always separated by broad masses of soft tissues; and there is a large central pith.

The cross-section of a root shows quite a characteristic structure. One of the roots magnified about six diameters is shown in cross-section in *Fig. 3*. The rough, corky exterior bark is shown at *a*,

the starch-bearing cortical parenchyma at *b*, at *g*, the inner layer of the bark wholly composed of soft tissues and containing little if any starch. But it is the woody cylinder that has the most characteristic structure. In many roots it appears crossed through its centre by a straight band of lignified tissue, consisting almost wholly of scalariform tracheids and ducts, mainly the former. This band is indicated at *c* in the Figure. Nearly all of the lignified tissue of the root is concentrated in this band, but a few small areas may be found on either side of it adjacent to the cambium zone. One of these is indicated at *e* in the Figure.

This appearance of the mature root is due to the fact that the

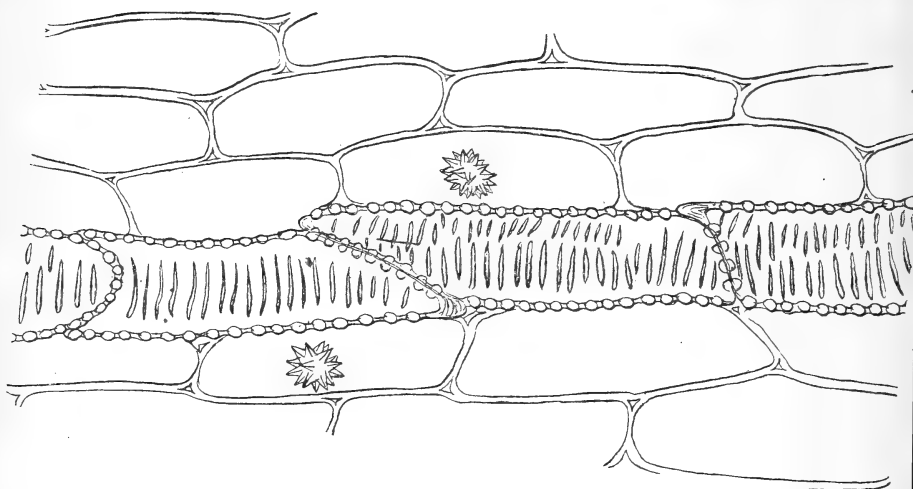


FIG. 5.

original radial bundle in the root is commonly di-arch, and during the course of the secondary changes it undergoes, it preserves its two-rayed character, the secondary formations, except narrow areas just back of each original phloem mass, producing but little lignified tissue.

The original bundles of the root, however, are not always di-arch; sometimes they are tri-arch, and sometimes tetrarch. Hence, an old or mature root may sometimes show three or four narrow xylem rays, instead of the straight band, shown in *Fig. 3*.

*Fig. 4* shows the cross-section of a younger root, which, however, has undergone considerable secondary changes, and which

possesses a tetrarch radial bundle. One of the original xylem rays is shown at *d*, and the other three at *d'*, *d''* and *d'''*, respectively. At *g* and *h*, are two of the four secondary xylem masses, which, to the naked eye, in a cross-section of the root, present the appearance of a cross.

The ducts and tracheids of the xylem, both of the rhizome and roots, are nearly all of the scalariform variety, and the component cells of a row of tracheids, or of a duct, as the case may be, are short and oblique-ended, or taper-ended, as shown in *Fig. 5*. In consequence of their shortness and the markings on the oblique end-walls, an unusual number of the tracheids show the scalariform markings when viewed in cross-section.

These markings, as they appear in this view, are indicated in *Fig. 4* at *g*, and in various other of the tracheary elements, shown in the same figure.

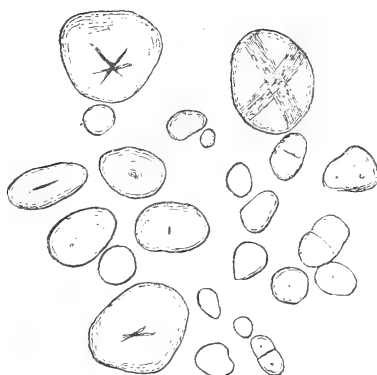


FIG. 6.

Starch is abundant in both the rhizome and the roots in most of the mature parenchymatous cells. The starch is small-grained and the grains are mostly simple, smooth and rounded or oblong and usually destitute of any very distinct markings. Only the largest grains show a fissure at the central or sub-central hilum. Sometimes these fissures have several rays and sometimes they consist of a single slit. Bi- or tri-nucleated grains are not uncommon and double or multiple grains sometimes occur. Concentric markings are seldom or never observable even in the larger grains, except by the aid of swelling reagents, and even then with difficulty. Only

the largest grains show a cross by polarized light. Even then the cross is very faint. The cross is usually somewhat oblique.

Old or mature roots contain great numbers of sphero-crystals of calcium oxalate, and these are frequently so arranged that when the transverse section of the root is cleared of its starch and proteids, it presents under a low power a somewhat annulate appearance. The rings shown in the woody cylinder in *Fig. 3* are due to this annulate arrangement of the crystal cells. Not all sections, however, show the annulate arrangement so distinctly as this one.

The tannin is the variety which produces a blue-black precipitate with ferric salts, and it occurs abundantly in nearly all the tissues of the root and rhizome, and more abundantly in the cell-walls than among the cell contents. The cork cells, especially the newer ones, appear to contain least of it. Old parenchyma cells that contain large quantities of starch also appear to contain somewhat less tannin than those which are younger.

The alcannin test also indicates the presence of small quantities of resin in the cells, sometimes in irregular or nodular masses of considerable size, more commonly in the form of minute particles imbedded in the protoplasm of the cells.

#### DESCRIPTION OF FIGURES.

*Fig. 1.*—A rhizome and roots of *Heuchera Americana* about natural size. Drawing made from living plant.

*Fig. 2.*—Transverse section of the rhizome magnified about six diameters. *a*, corky exterior layer, showing its friable character; *b*, cortical parenchyma; *c*, cambium zone; *d*, one of the xylem wedges; *e*, a broad medullary ray; *f*, xylem of a root bundle, the section having passed through the base of a root; *g*, pith.

*Fig. 3.*—Cross-section of one of the older roots magnified about six diameters. *a*, cork; *b*, cortical parenchyma; *c*, end of one of the secondary xylem rays; *d*, faint circle caused by the peculiar arrangement of the cells containing calcium oxalate crystals; *e*, a small mass of tracheary tissue in secondary xylem; *f*, cambium; *g*, soft bast layer.

*Fig. 4.*—Root as seen in cross-section, magnified sixty-six diameters. *a*, cork; *b*, cortical parenchyma, the outer cells of which are somewhat collenchymatous; *c*, medullary ray; *d*, *d'*, *d''*, *d'''*, original xylem rays of the tetrarch radial bundle; *e*, primary phloem; *f*, meristem; *g*, one of the tracheids in the secondary xylem, showing scalariform markings on the oblique end-wall; *h*, another of the four secondary xylem rays.

*Fig. 5.*—Small portion from xylem region in longitudinal section of root, showing row of scalariform tracheids and some of the adjacent parenchyma cells. Magnification 330 diameters. Two of the parenchyma cells contain spherocrystals of calcium oxalate.



Fig. 6.—Starch grains from root of *Heuchera* magnified 800 diameters, one of the larger grains as viewed by polarized light, the others as seen by ordinary light.

PHILADELPHIA, September 17, 1894.

## THE GRAIN WEIGHT.\*

A STUDY OF WHEAT.†

BY J. U. LLOYD.

*Historical.*—The cereal *Triticum sativum* is the most valuable of food-producing plants, its seed, under the name of “wheat,” being the principal bread-stuff of civilized nations. The plant is accepted by some to have been a grass that originated in the Mediterranean country, but this impression seems largely to be based on conjecture, and its origin as a food plant is probably lost in the darkness of antiquity.

Scripture mentions the plant, and by some persons its origin has been ascribed to ancient Egypt. China is said to have introduced wheat 2,700 years before Christ. These points are records of general history and pass comparatively unaltered through ordinary literature.

Standard modern dictionaries inform us that the weight of the fruit of this plant is the basis that 600 years ago in England was used to establish the grain weight. Most authorities make the same general statement to the effect that a plump grain of wheat was used as the standard employed to establish the grain, but Prof. Remington (“Remington’s Pharmacy”) gives the matter a historical record better than any other pharmacy work consulted, and with which, in a general way, my own researches agree.

As the statements of authorities as a rule coincide with that of Webster, it may be taken as typical, to wit:—“*Grain.*—The unit of

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\* Read at the forty-second annual meeting of the American Pharmaceutical Association, Asheville, N. C. Contributed by the author.

† As a study of the grain weight in its connection with the grain of wheat, perhaps this paper is sufficient. As a study of wheat in an economic sense, many gaps should be filled. For example, England, New Zealand and Australia should each be averaged in an equal number of specimens to those of other countries. And now I desire to express my thanks to my friend, Dr. Sig-mund Waldbott, who, with painstaking care, assisted in the detail work of the investigation, and to whose patience I am largely indebted for the completeness of this paper.—L.

the English system of weights, so called because considered equal to the average of grains taken from the middle of the ears of wheat." This would lead us to believe that a grain in weight should be the counterpart of an average grain of wheat.

Concerning the origin of the grain weight, C. W. Pasley, "Measures, Weights and Money," London, 1834, p. 8, says: "—those days of feudal ignorance, in which the standard of English lineal measure was referred to the average length of a barleycorn, and the standard of weight to the average weight of a dry grain of wheat from the middle of the ear," which might also lead to the inference that our present grain weight represented the weight of an average grain of wheat at the time of standardization.

But careful preliminary weighings, which I had made of good samples of wheat, convinced me that an inference drawn to that effect would be erroneous and that modern grains of wheat do not average a grain in weight. It is exceptional for a single abnormally large wheat grain to weigh a grain.

Giving the literature on the subject some further study, in order to find an explanation of the inconsistency mentioned, I arrived at the fact, that, while the grain weight actually represented the weight of average grains of wheat about 600 years ago, this standard was changed 200 years afterwards.

Johnson's Universal Cyclopædia, 1893, gives the following summary of that fact in the definition of the word "Grain": "*Grain.*—A statute of Henry III (in the year 1266) enacted that 32 grains of wheat from the middle of the ear, well dried, should weigh a pennyweight, of which 20 should go to the ounce; but finally in the 12th year of Henry VII, the pennyweight came to be divided into 24 grains."

Thus it is seen that 32 standard grains of wheat were used 600 years ago to establish the *pennyweight*, which then became the *unit* of weight. This pennyweight, about 200 years afterwards, was divided into 24 parts, and thus produced the number of grain weights (24) that now (providing no other changes were made in the standard) make a pennyweight. Hence, one pennyweight (or 24 grains in weight) should now balance 32 grains of wheat, if wheat still conforms in size and weight to the standard taken as an average of wheat in the year 1266. In order to conform to the standard employed by statute of Henry VII, 100 grains of wheat should only weigh 75 grains.

*Comparison of Different Wheats.*—We have thus (if no subsequent change was made) a well-established standard concerning the weight of wheat 600 years ago, and an average of the wheat of the world now should show us the effect that time and cultivation have had on the size of the fruit. It is not enough for this purpose to take the product of a single state, or of one country; a broad average should be made of the wheats of the world. This seed, like other plants, is affected by drought and climatic influences, and yet, an average of the wheat products of the principal wheat-yielding lands of civilization might give us a record that may be accepted as indicating either that the grain, so far as size is concerned, is being improved or is retrograding. The English grain weight has probably remained intact since its second standardization,\* and if any change has occurred, it is to be looked for in the weight of the seed of the wheat. According to the statute of King Henry III (already cited), the standard grains are "well dried," and in the determinations made herein, well-dried is taken to have meant air-dried. We are told by the Century Dictionary that such countries as yield a surplus of wheat are the United States, Canada, Russia, Hungary, India, Australia, Egypt, Roumania and Turkey. In addition to specimens from most of these countries, I procured also specimens from New Zealand, England and several South American States. These specimens are taken from commercial lots, and are averages of such as are sold in large amounts in the grain market, all of crop 1893,† except Rosario, 1892.

Here I may add that most of the American as well as the foreign specimens were procured by Messrs. Smith, Hammond & Co., of Baltimore, to whom I was introduced through the courtesy of Messrs. Gale Bros., Cincinnati, O., and that Mr. Albert McCullough, of the firm of J. M. McCullough's Sons, of Cincinnati, cabled to London for Egyptian wheat,‡ and collected the Ohio and Wisconsin samples. To these gentlemen my thanks are herein extended; but for their aid the research would have been impracticable.

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\* "Fortunately, one unit common to troy, apothecaries' and avoirdupois weight has been saved—namely, the *grain*."—*Remington's Pharmacy*, p. 35.

† Weighings were made the second week in August, 1894. A loss of 6.77 per cent. resulted in dry wheat out of the harvest field after five days' exposure to a temperature of 138° F. in a drying-room.

‡ The Egyptian wheat did not come to hand in time to be included in this paper.

On comparing the samples it is seen that they can be divided into classes; one "red wheat," hard, compact, horny, elongated, usually slender, and of a red-brown, often dark, nearly amber color; the other, "white wheat," of larger grain, more plump, of usually chalky (starchy) fracture and of a yellowish-white color.

Since I found no record concerning the variety of English wheat that furnished the standard of the grain weight, it is unnecessary for us to separate the two classes, and hence, in this part of the paper I shall average them all.

One hundred grains were selected from each specimen, care being taken to select full, plump, smooth, perfect seeds of a uniform, large size. By comparing the wheat in the heads of wheat from our Ohio wheat fields, it was shown that by this method a close average could be made of the size of the middle grains of wheat of the head.

The result was as follows :

TABLE I.

ONE HUNDRED WHEAT GRAINS, OF UNIFORM SIZE, WEIGHED AS FOLLOWS:

* 84.190	Grains, No. 1, Club, Bombay, India.
* 79.118	" No. 1, Bombay, India.
* 78.128	" Choice, Bombay, India.
* 77.890	" Chili.
* 77.878	" New Zealand, White.
77.378	" England, Red.
* 74.430	" California, Choice.
* 72.083	" New Choice, Bombay, India.
69.973	" New Zealand, Red.
* 67.836	" Australia.
* 66.593	" Chili.
* 64.838	" England, White.
* 60.343	" California, No. 1.
* 56.857	" Kurrachee, Soft, White, India.
* 56.638	" Baltic, Russia.
55.318	" Barletta, South America.
54.918	" Calcutta, India.
* 54.890	" California, Blue Stem.
* 54.668	" Kurrachee, White, India.
54.190	" Rosario, Argentine, 1893, South America.
54.164	" Kurrachee, Red, India.
53.698	" Patagonia, South America.
53.613	" Ohio, Poole, Winter.
53.423	" Azima, Russia.
51.983	" Azima, Odessa, Fine.
51.853	" Baltimore, Red, Winter.

51'431	"	Entre Rios, South America.
* 51'403	"	Ohio, White, Winter.
49'543	"	Black Sea, Ghirka, Russia.
49'268	"	Ghirka, Fine.
47'828	"	† Chicago, Spring.
47'404	"	Wisconsin, Spring.
46'693	"	Duluth, Hard.
46'133	"	Black Sea, Azima, Russia.
46'078	"	River Plate, South America.
* 45'658	"	Washington State.
43'908	"	Manitoba, Spring, Hard.
43'753	"	Rosario (Argentine), 1892, South America.
42'923	"	Odessa, Azima, Russia.
42'783	"	Ghirka, Fine, Russia.
40'478	"	Duluth, Spring.
37'448	"	Ghirka, Russia.

\* Denotes white wheat, and it is obvious from this table that white wheat heads the list, as far as size of the grain is concerned.

† Northwest probably.

It would be erroneous, however, to base a commercial valuation of wheat (outside of appearance) solely upon the weight of the grain, and the second part of the paper will demonstrate some additional considerations that lead us to modify the results of such a valuation.

From the foregoing list the two following tables are abstracted:

I—AVERAGE WEIGHT OF WHEAT FROM EACH COUNTRY.

	<i>Grains.</i>
Australia and New Zealand . . . . .	71'895
England . . . . .	71'108
India . . . . .	66'765
South America . . . . .	56'119
United States and Canada . . . . .	51'541
Russia . . . . .	47'795
Total average . . . . .	60'870

II—AVERAGE WEIGHT OF THE HEAVIEST SAMPLE FROM EACH COUNTRY.

	<i>Grains.</i>
India . . . . .	84'190
South America . . . . .	77'890
Australia and New Zealand . . . . .	77'878
England . . . . .	77'378
United States and Canada . . . . .	74'430
Russia . . . . .	56'638
Total average . . . . .	74'734

*Summary.*—(1) Accepting that the standard grain weight was created from grains taken from the middle of a selected head of wheat, it is shown that from bulk lots of wheat that appear in most of the markets of the world, an average of the heaviest samples will yield a grain as heavy as was the grain of the original standard.

(2) The general average of all the samples is below the standard grain weight, being 60.870, when it should be 75.000.

(3) With two exceptions (England and New Zealand), white wheat headed the list as far as size of grain is concerned.

(4) Warm countries seem to yield the largest grain, and also contributed the greatest proportion of white wheat according to these samples. Thus, India furnished but one specimen of red wheat out of eight considered, and supplied three specimens to head the list in comparative weight, while Russia furnished but one specimen of white wheat (which, however, came from the Baltic Provinces) out of nine samples, and averaged last in the list (see table I)

Standard modern dictionaries and other authorities inform us that the grain weight was established in England 600 years ago, from the weight of carefully selected wheat grains. (Webster, Pasley.)

From these statements an inference might be drawn, as though the average wheat grain should equal a grain in weight. Experiment shows, however, that it is exceptional for a grain of wheat to weigh as much as a grain.

This seeming contradiction is readily explained by the historical fact, viz.: that by statute of King Henry III (1266), it was enacted that 32 grains of wheat, from the middle of the ear, well dried, should weigh a pennyweight; and that in 1497, by statute of King Henry VII, this standard was changed, inasmuch as the same pennyweight was then subdivided into 24 grains. (See Johnson's *Cyclopædia*.)

Thus, until 1497, 32 average grains of wheat weighed 32 grains, providing grain-weights were then employed; but after the enactment of Henry VII, the 32 grains of wheat weighed but 24 reconstructed grains. Since then the grain standard, so far as I can determine, has suffered no further change; 100 average grains of wheat should therefore weigh 75 grains.

In comparing with one another the weights of forty-two separate lots, each of 100 grains, from specimens of wheat from different countries (Australia, England, India, Russia, South America, United

States and Canada), the general average in the weight of wheats from all the before-named countries (see Table I), was found to be far below the given standard, it being only 60.87 grains. However, an average of the heaviest of the specimens, one from each country, came very close to that of the original standard, viz.: 74.734, instead of 75 grains.

This would seem to show that cultivation and climatic conditions, during a period of 600 years, have exercised but little, if any, influence on the weight of selected wheat.

## A MICROSCOPICAL AND CHEMICAL EXAMINATION OF CLOVES.

BY HENRY KRÆMER.

More than a year ago, a sample of a spice was submitted to the author, an examination of which revealed the presence of a large quantity of starch. The question was then asked: "How much is there of this adulteration?" A quantitative answer was desired without a chemical analysis. This was the beginning of the present work, and very naturally the thought arose—Is it possible to obtain quantitative as well as qualitative results with the microscope? The results are embodied in this paper—which is intended, however, merely as a preliminary paper—on the comparison of quantitative microscopical with chemical examinations, and, it is hoped, will reveal the possibilities of research in this direction. At the same time are given the results of analysis of some commercial samples of clove oil and cloves by Thoms' method (with perhaps a slight modification) of determining the eugenol in the form of a benzoyl compound.

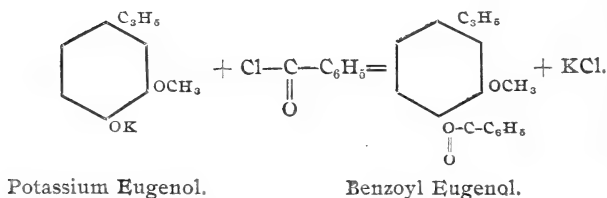
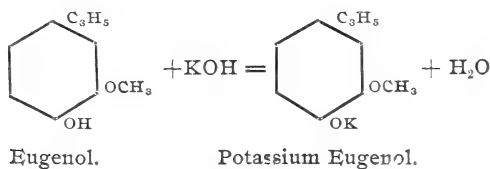
*Extraction of Oil from Cloves.*—10 grams of the powder were mixed with 10 grams of dried calcium sulphate, wrapped in filter-paper and extracted in a Soxhlet apparatus by means of petroleic ether. Some of the ether was recovered, and the remainder was siphoned off by means of a siphon and a suction of air. The oil thus obtained had a viscous appearance, and on the addition of alcohol, about 0.16 per cent. of a white resinous compound separated, which on the filter assumed the form of a very fine gauze. To this filtered solution, from 8 to 10 cubic centimetres alcoholic potash solution (1 cubic centimetre = 0.09856 KOH) were added. The

alcohol was removed on a water-bath, and to the nearly dried mass, from 2 to 2½ cubic centimetres of benzoyl chloride were added. The mixture, in a flask similar to that in which the extraction had been done, was stirred with a glass rod until the reaction was complete. Water containing some KOH was then added, and the whole heated on a water-bath for a few minutes, then removed and placed in ice-water, and, when cooled, the clear liquid decanted, and if there were any floating oily particles, these were removed in a separatory funnel by means of ether. This washing was continued three or four times, and finally the benzoyl eugenol was separated from the water by means of a separatory funnel with ether. The ether was evaporated off (assisted by siphoning the vapor and the use of the suction of air). The mass, on cooling, crystallized. These crystals were dissolved in 15 cubic centimetres of alcohol (90 per cent.), heated to solution and recrystallized by placing in ice-water and shaking the flask repeatedly. The solution was decanted and filtered through a small filter from the crystals, and the latter simply washed with an additional 15 cubic centimetres of alcohol (90 per cent.). The crystals in the flask with filter paper were dried at 100° C., and then weighed,

1 gram eugenol requires .341 gram KOH.

1 gram eugenol requires .693 benzoyl eugenol.

5 cubic centimetres alcohol (90 per cent) will dissolve .110 gram benzoyl eugenol.



Thoms has worked out an algebraic formula for hastily calculating the results, which may be translated as follows:



$a$  = weight of benzoyl eugenol.

$b$  = weight of oil taken.

$c$  = + 0.110 gram for every 5 cubic centimetres of alcohol used  
 (being the weight of benzoyl eugenol dissolved in 90 per  
 cent. alcohol).

$x$  = per cent. of eugenol.

Molecular weight of eugenol = 164.

Molecular weight of benzoyl eugenol = 268.

Then

$$268 : 164 = (a + c) : \text{weight of eugenol.}$$

$$\text{Weight of eugenol} = \frac{164(a + c)}{268}$$

$$b : \frac{164(a + c)}{268} = 100 : x$$

$$x = \frac{164(a + c) 100}{268b}$$

$$x = \frac{4100(a + c)}{67b}$$

The following results have been obtained by this method from the commercial samples of powdered cloves and clove oil:

<i>Powd. Cloves.</i>	<i>Per Cent. Oil.</i>	<i>Per Cent. Eugenol.</i>
No. 1 . . . . .	17.50	59.74
No. 2 . . . . .	17.75	60.45
No. 3 <sup>1</sup> . . . . .	12.75	66.16

<sup>1</sup> This sample was determined by the microscope to contain powdered clove stems, although sold by a large house in New York as powdered cloves.

<i>Clove Oil.</i>	<i>Per Cent. Eugenol.</i>
No. 1 . . . . .	76.06
No. 2 . . . . .	78.12
No. 3 . . . . .	83.45

Coming to the subject of quantitative microscopical analysis, while accurate results may be possible, so far, only approximate figures have been obtained. These may not be without interest and value, and it seems probable that an analyst who is able to use the microscope may, by a few moments' careful examination, obtain evidences that will materially aid him in subsequent chemical analysis. Regarding the statements made by some that "the results of microscopical examination are not always uniform," I must refer them to

the non-conformity in results of analytical chemists in organic and even in inorganic analyses, unless by practice the individual masters the difficulties. And again, it has been recently said, "that in the case of the deterioration of vegetable drugs through atmospheric influences or age, as well as in the adulteration of a genuine with inferior drugs, the difficulty of determining with the microscope the respective extent of change or adulteration is almost insuperable." This may seem to be so, and while chemical analysis is necessary, still there are many cases where the quantitative determination of admixtures and adulterations, if they are to be determined, can be done so only by means of the microscope.

It would not be a hard matter to prepare a lengthy paper on the difficulties attendant upon research in this direction. Was there anything more difficult a few years ago than the study of bacteria? Not until Koch devised a convenient and comparatively easy method for this kind of investigation, did this department, which to-day is recognized as a branch in science, become so popular. Even the medical student of the first and second year is taught to recognize and diagnose the insignificant bacillus tuberculosis.

As has been said before, this paper is but a preliminary one, and while the author has been at work upon the subject for some time, the work has been done under rather disadvantageous circumstances, and it is presented at this meeting to elucidate a principle, and present the results of what may be an incomplete method, for your consideration. The method of procedure is as follows: A measured quantity (about 200 gram) of substance is thoroughly mixed with a measured amount (2 or 3 cubic centimetres) of water. One, two or three drops, formed on the finger, of this mixture, are placed in the slide and covered with a cover-glass. In the eye-piece of the microscope is slipped a piece of glass, corresponding to an ocular micrometer, containing 100 square millimeters. By a little practice, a slide may be prepared that is fairly uniform, or uniform places upon it may be selected. This being done, then a count is made of the number of starch grains, fibres, or characteristic tissue in the spurious substance, contained in 100 square millimetres, and the same compared with a genuine sample. For instance, mixtures were made of genuine cloves with potato-starch, wheat-starch, cedar-wood, turmeric, and it was observed that quantitative relations by comparison do, to some extent, hold even in this crude way of procedure. In determining the oil a slightly different method was pursued.

I. A sample of pure potato-starch was examined and 100 (mm.)<sup>2</sup> was found to contain (32 + 28 + 32 + 35) 127 starch grains. Another 100 (mm.)<sup>2</sup> contained (32 + 30 + 28 + 30) 120 starch grains.

II. A sample of powdered cloves admixed with 50 per cent. of potato-starch yielded the following results :

- (1) (14 + 15 + 12 + 15) 56 grains = 45.34 per cent.
- (2) (13 + 11 + 18 + 13) 55 " = 44.53 "
- (3) (17 + 16 + 16 + 13) 62 " = 50.20 "

III. A sample containing 30 per cent. of potato-starch :

- (1) (10 + 10 + 11 + 11) 42 grains = 34.00 per cent.
- (2) ( 7 + 10 + 11 + 8) 36 " = 29.14 "

IV. A sample containing 20 per cent. of potato-starch :

- (1) (7 + 8 + 7 + 8) 30 grains = 24.29 per cent.
- (2) (7 + 6 + 9 + 9) 31 " = 25.10 "

V. A sample containing 10 per cent. potato-starch :

- (1) (4 + 2 + 3 + 2) 11 = 8.90 per cent.

VI. A sample of pure red cedar yielded the following :

- (1) (10 + 10 + 8 + 9) 37 fibres to 100 (mm.)<sup>2</sup>.

VII. Cloves containing 20 per cent. red cedar yielded :

- (1) 7 = 18.91 per cent.
- (2) 9 = 24.35 "
- (3) 8 = 21.60 "

VIII. Cloves containing 10 per cent. red cedar yielded :

- (1) 4 fibres = 10.8 per cent.
- (2) 3 " = 8.10 "

All of the above results were obtained by using  $\frac{1}{4}$ -inch objective. In the examination of turmeric  $\frac{1}{2}$ -inch objective was used.

IX. Turmeric pure using one part of water :

- (1) (11 + 11 + 6 + 5) 33 grains.
- (2) ( 7 + 8 + 6 + 5) 26 "
- Average  $\times 2 = 118$  "

X. Cloves containing 10 per cent. turmeric, using two parts of water :

$$(1) 10 = 8.47 \text{ per cent.}$$

$$(2) 11 = 9.32 \quad "$$

$$(3) 10 = 8.47 \quad "$$

While the above results show a variance, and one that is not constant in any one direction, still they are of some encouragement. Hoping that the possibilities of this kind of research were not limited to mechanical admixtures, the author experimented with the view of obtaining quantitative results upon the oil contained in cloves. For this purpose a small extractor, graduated to a mark, was made out of a piece of glass tubing. This was filled to the mark with cloves and exhausted with ether, the whole operation requiring about one minute. The ether containing the oil was allowed to drop in a watch crystal containing a few drops of alcoholic KOH solution, the potassium eugenol forming at once and the ether evaporating. To the residue was then added a known quantity (2-3 cubic centimetres) of water, the mixture thoroughly stirred, and a drop of the liquid collected on the finger and used on the slide; 25 (mm.)<sup>2</sup> were examined and the number of (mm.)<sup>2</sup>—approximately—filled with crystals were counted.

XI. Pure sample of cloves :

$$\begin{array}{l} (1) \quad 9. \\ (2) \quad 6. \\ (3) \quad 9. \end{array} \left. \vphantom{\begin{array}{l} (1) \\ (2) \\ (3) \end{array}} \right\} \text{Average} = 8.$$

XII. Sample containing 50 per cent. of cloves of original sample contained :

$$\begin{array}{l} (1) \quad 4. \\ (2) \quad 3. \\ (3) \quad 4. \end{array} \left. \vphantom{\begin{array}{l} (1) \\ (2) \\ (3) \end{array}} \right\} \text{Average} = 11 = 45 \text{ per cent. oil.}$$

Three commercial samples were examined, one that was said to contain much allspice. An examination based on the "port wine" cells of allspice yielded the following results :

XIII. Genuine allspice sample yielded :

$$(5 + 9 + 3 + 3) = 20 \text{ "port wine" cells.}$$

XIV. Commercial sample gave :

$$(3 + 3 + 4 + 3) = 13 \text{ "port wine" cells} = 65 \text{ per cent. allspice.}$$

A sample supposed to contain a large amount of wheat-starch yielded a surprisingly small amount comparatively, as was shown conclusively on comparing with pure mixtures of wheat-starch and cloves :

XV. Pure sample of wheat-starch contained :

$$(69 + 68 + 67 + 69) \text{ 273 grains.}$$

XVI. Sample of cloves containing 25 per cent. of wheat-starch :

$$(16 + 19 + 16 + 18) \text{ 69} = 25.28 \text{ per cent.}$$

XVII. Sample of cloves containing 10 per cent. of wheat-starch :

$$(13 + 9 + 7 + 10) \text{ 39 grains} = 14.2 \text{ per cent.}$$

$$(9 + 7 + 9 + 8) \text{ 33 " } = 12.0 \text{ "}$$

XVIII. Commercial samples, adulterated with wheat-starch :

$$(1) \text{ 100 (mm.)}^2 = 18$$

$$(2) \text{ " } = 24$$

$$(3) \text{ " } = 28$$

$$(4) \text{ " } = 24$$

---


$$4)94$$

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$$23.5$$

The sample contained, therefore, 8.93 per cent. of wheat-starch —probably 10 per cent.

XIX. Commercial samples with a slight clove odor. Under the microscope, this revealed the presence of clove stems and starchy material. It yielded scarcely any potassium eugenol, but a green-colored liquid to ether. This sample showed adulteration, and either an extraction of oil by distillation or loss of oil.

Anyone who has labored with microscopical work for other than mere pleasure can readily comprehend the difficulties that must have been overcome by the author in this investigation thus far. And they who will attempt to corroborate these results, or do original work in this direction, must not be disappointed if results are not at once forthcoming. "Nature is taciturn and one must wrench her secrets from her." But after these secrets are well obtained and the way discovered, the work is not so difficult.

The author hopes to elaborate upon the principles contained in

this article, and that by similar methods, especially extraction and micro-chemical tests, the more important plant constituents even may be determined in a quantitative manner. Smaller squares than millimetres may be employed. Instead of tests being made upon a few milligrams of material, several grams should be used to obtain more uniform results. It is believed that by preparing carefully a series of powders with the adulterants, fairly accurate results may be obtained—certainly sufficient to determine approximately the extent of adulteration without recourse to elaborate and prolonged chemical analyses. By employing the most accurate methods of sampling in use in the assay laboratory, samples must be obtained that are representative. Enlargements by photo-micrography, and subsequent cutting out and comparing by weight the tissues printed and the part remaining, may be of service. Finally, much time must be yet devoted in ascertaining the real and permanent value of quantitative microscopical results to that of chemical results. It is hoped that many will pursue similar lines of research.

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THE NAMES OF MEDICINAL PLANTS OF COMMERCIAL  
VALUE THAT ARE GATHERED IN NORTH CARO-  
LINA: THEIR VALUE, AND RELATIVE AMOUNT  
SOLD IN THIS COUNTRY AND EXPORTED.\*

BY WILLIAM SIMPSON, RALEIGH, N. C.

North Carolina has been facetiously termed a strip of land between two States, and if we wish to know something of its products, by reference to the geographies of the country, we learn that it is celebrated for its tar, pitch and turpentine. It is with a view of bringing more prominently to the notice of the members of the American Pharmaceutical Association the wonderful resources of North Carolina that I have accepted the query proposed.

North Carolina, from its position in the Union, being about midway between the North and South Atlantic States, is blessed with a climate that partakes of the extremes of neither, and presents the only instance where the influence of latitude is compensated for by that of longitude. Beginning at its eastern boundary, where its

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\* Read at the meeting of the American Pharmaceutical Association, held at Asheville, N. C., September, 1894.

shores are washed by the tempered waters of the Gulf Stream, we have the palmetto, the live oak, and the sugar cane; and proceeding westward, we attain an altitude of 6,700 feet, the highest point east of the Rocky Mountains, where we find the fir, the hemlock, the balsam and the white pine, thus representing all the varieties of soil and climate, from Florida to Canada. Indeed, it may possibly be a matter of surprise to many of you to know that were North Carolina wheeled about so as to occupy a position directly north and south, it would extend across the States of Virginia, Pennsylvania and New York, and over Lake Ontario into Canada.

The gradual increase in elevation from east to west secures to the State a variety of climatic influence that would be gained by twenty degrees of latitude.

North Carolina has been a favorite field with the most distinguished botanists. From Bartram, who made his tour in 1776, the elder and younger Michaux, from 1787 to 1802, down to the later botanical explorers, Dr. de Schweinitz, Nuttall, Dr. Gray, Mr. Cary, who explored the higher ranges of our mountains in 1841, and our own Dr. Curtis—all agree that nowhere on the American continent are trees to be found of such beauty, value and variety, as in North Carolina. Many of the trees and shrubs now familiar to European ornamental and economic uses were introduced from this State, among which are the locust (*Robinia pseudacacia*), the tulip tree (*Liriodendron*), the rose locust (*Robinia hispida*), the rhododendron in its various forms, the ivy (*Kalmia latifolia*), and many others, confirming what Dr. Curtis has said, that “in all the elements which render forest scenery attractive, no portion of the United States presents them in happier combination, in greater perfection, or in larger extent than do the mountains of North Carolina;” and he might have said the same of the State at large, for no portion of it is deficient either in the number or variety of its species, or in the size and value of its trees.

In order to realize the extent to which this richness of forest development is concentrated within the area of this State, it is only necessary to call attention to the distribution of a few kinds which are dominant and characteristic. Of species found in the United States, east of the Rocky Mountains, there are Oaks 22, and 19 in N. C.; Pines 8, and 8 in N. C.; Spruces 5, and 4 in N. C.; Elms 5, and 3 in N. C.; Maples 5; and all in N. C.; Walnuts 2, and both in

N. C.; Hickories 8, and 6 in N. C.; Magnolias 7, and 7 in N. C. As to the first and most important group of the list, attention is called to the fact that there are more species of oaks in North Carolina than in all the States north of us, and only one less than in all the Southern States east of the Mississippi.

Perhaps it would not be amiss here to state that North Carolina enjoys the peculiar distinction of being the only State in the Union that fills completely every blank in the returns, as sent out by the Department of Agriculture at Washington.

Of the 182 official galenical drugs of the U. S. Pharmacopœia, 94 are of foreign growth, and of the balance, indigenous to the United States, all but one are found in North Carolina.

Glancing over a price-list of one of the largest of our fluid extract manufacturers, comprising 328 varieties of drugs, foreign and domestic, I find that of the latter more than 90 per cent. are indigenous to North Carolina.

I think that I am within the bounds of truth when I say that the firm doing the largest business as herbalists in the world is in North Carolina. The amount of business done by them may be illustrated by the following extract taken from their order-book, covering one month's sales: 50,000 pounds Mandrake, 5,000 pounds Black Cohosh, 12,000 pounds Wild Cherry Bark, 8,000 pounds Red Clover Blossoms, 12,000 pounds Pennyroyal, 9,000 pounds Catnip, 8,000 pounds Stramonium leaves, 8,000 pounds Witch-hazel, 8,000 pounds Yellow Dock, 6,500 pounds Stillingia, 8,000 pounds Unicorn Root, etc.

They have taken a single order from one firm for as much as half a million pounds of drugs. Beginning in a small way some thirty years ago, this firm has gradually increased its business until they now employ more than three hundred agencies, and ship millions of pounds of drugs, consisting of more than 2,300 varieties. There are other smaller concerns in the State doing a less amount of business, confined to about one hundred varieties.

Ginseng is one of the most valued of the indigenous drugs of our State, commanding as much as \$3 to \$4 per pound. Therapeutically, it is of no value, except in the eyes of the Chinese, by whom it is greatly esteemed, and to whom it is all sent. Efforts to cultivate it have proved unremunerative; but so eager are the collectors to obtain it that it is frequently dug before the seeds are fully matured, necessitating the passage of a law by our Legislature preventing its collection before September.



Altogether, the shipment of indigenous drugs runs up into millions of pounds annually.

To my regret I have been unable to procure accurate information concerning the money value of the native drugs shipped from this State. The firms to which I applied either could not furnish it, or, for reasons best known to themselves, did not care to do so. I have therefore had to omit a reply to that part of the query, also to that part of it in regard to exports.

During the last two years of the "late unpleasantness," when the ports of the Southern States were blockaded, and medicines of all kinds were difficult, if not impossible, to be obtained, resort was had to our native materia medica, and well did it stand us in stead.

The climate of North Carolina is that happy mean between heat and cold, drought and moisture, arctic sterility and tropical exuberance, in which energies are stimulated by the bracing breath of a tempered atmosphere, cool enough to inspire physical activity, and warm enough to secure abundant returns to the tiller of the field whose labor is carried on under the happy conditions of a genial air, a friendly sun and a responsive soil.

In the sanitary department of the Census Reports it is stated that one or two of the three most healthful localities in the United States are found in the mountain regions of western North Carolina. There pulmonary consumption has never been known to originate. This feature has given the climate a celebrity for its remedial agency in such diseases, and has caused invalids to resort to the State from all parts of the Union, finding in many instances decided benefit or perfect cure.

It may be of interest to note that for spring the average temperature of the State is  $57^{\circ}$  F., for summer  $77^{\circ}$  F., for autumn  $59^{\circ}$  F., and for winter  $41^{\circ}$  F. Taking typical localities in each section as points of comparison, we find the mean annual temperature of Raleigh, in the middle section, to be  $60^{\circ}$  F., its summer temperature  $76^{\circ}$  F., and its winter temperature  $44^{\circ}$  F., while Florence, Italy, has respectively the temperatures:  $59^{\circ}$  F.,  $75^{\circ}$  F. and  $44^{\circ}$  F. In the eastern section, Beaufort, on the coast, shows as the mean  $62^{\circ}$  F.,  $78^{\circ}$  F. and  $46^{\circ}$  F., while Genoa, Italy, has  $61^{\circ}$  F.,  $75^{\circ}$  F. and  $47^{\circ}$  F. In the mountain section, Asheville shows mean temperatures for the year,  $54^{\circ}$  F.,  $71^{\circ}$  F. and  $38^{\circ}$  F., which may be compared with Venice, Italy, which has  $55^{\circ}$  F.,  $73^{\circ}$  F. and  $38^{\circ}$  F.

Should one not be satisfied with the conditions of temperature mentioned, and wish to avoid frost, there is within the mountains of North Carolina a thermal belt in which frost is unknown.

This frostless area is found on both sides of the mountains. The most noted of such regions is on Tryon Mountain in Polk County, and so sharply defined are the lines of exemption that it stands out a horizontal belt of verdure between areas above and below of blasted flower and foliage. Within this exempted area fruits never fail, and though at the height of 1,500 to 2,000 feet above sea level, frost never appears.

I am indebted for many of the foregoing statements to the Hand Book of North Carolina, published by our Agricultural Experiment Station, also to the State Board of Agriculture for its courtesy in permitting me to exhibit to the Association a collection of native drugs comprising four hundred and twenty-five varieties, which formed the exhibit of Messrs. Wallace Brothers, of Statesville, N. C., at the Columbian Exposition at Chicago, and which was afterwards donated by them to the State.

My acknowledgments are also due to Prof. Gerald McCarthy, of the Botanical Division of the North Carolina Agricultural Experiment Station, for a copy of Dr. M. A. Curtis' catalogue of the indigenous and naturalized plants of the State—a very rare book, comprising nearly five thousand species; also for a copy of Wood & McCarthy's "Wilmington Flora," consisting of more than twelve hundred varieties.

I take the liberty of adding the following extract from a letter of Prof. McCarthy's, which may possibly interest some member of the Association, viz.: "If any of your confrères should read a practical paper on drug farming, as distinguished from mere gathering of wild spontaneous growth, I believe Director Battle would agree to try the most promising plants as experimental crops and publish the results."

My thanks are also due to Messrs. Wallace Brothers, of Statesville, N. C., and to the National Sumac and Herb Co., of Henderson, N. C., for assistance, by which I am enabled to present a partial list of native drugs handled by them.

The author here concludes his paper with a list of over six hundred plants offered by the above firms.

## RÉSUMÉ OF THE REPORT OF THE COMMITTEE ON ADULTERATIONS TO THE OHIO STATE PHARMA- CEUTICAL ASSOCIATION.

BY PROF. B. S. YOUNG AND J. D. LISLE, M.D.

*Acida.*—Samples of nearly all common acids were examined and were found to fulfill the official requirements of strength and purity.

*Acidum Boricum.*—The products of three prominent manufacturers were examined. They conformed in every particular to the demands of the Pharmacopœia.

*Bismuthi Subcarbonas* contained traces of chloride, alkali or alkaline earths and arsenic.

*Cinchona.*—The amount of alkaloids in the five samples assayed ranged from 1·5 per cent. to 5 per cent., with an average of 3·4 per cent. The lot that showed 5 per cent. of total alkaloids contained 1·6 per cent. of quinine.

*Glycerinum*, of which fourteen samples, representing all the leading brands, were subjected to examination, was found to be satisfactorily pure. The absence of arsenic was particularly established.

*Iodoformum.*—One sample of the crystals and two of the powdered article were tested. A sample of the latter yielded 0·08 per cent. of fixed impurities. The other products were entirely dissipated by heat. Water, shaken with the substances, remained tasteless, colorless and neutral, but contained iodide, as was shown by silver nitrate.

*Galapa.*—11·5 per cent., 12·6 per cent. and 12·5 per cent. of resin was obtained from the three different lots estimated. One and a half per cent. of the yield from the first quality was soluble in ether. The resin from the other two samples was entirely soluble.

*Oleum Lini.*—A sample of this was found to be viscid, *opaque*, of *fishy* odor and neutral to litmus. On standing it threw down a white precipitate. Further examination showed it to be adulterated with paraffin and cottonseed oil.

*Opium.*—Assays by the U. S. P. method showed an average of 12·18 per cent. of morphine in the four samples treated. The results obtained ranged from 8·9 per cent. to 15·6 per cent.

*Paraldehydum* was found to be of very strongly acid reaction. Sulphuric and hydrochloric acids were not detected in either of the three products. Mixtures of 8 c.c. of each sample in an equal volume of alcohol, with phenolphthalein as an indicator required respect-

ively 4.15 c.c., 4 c.c. and 12.8 c.c. of normal potassium hydrate volumetric solution.

This excessive acidity was found to be due to acetic acid, resulting from the gradual decomposition of the paraldehyde through long standing and exposure to air. Foreign aldehydes were absent.

*Potassii Bitartras.*—The official requirements were met by the two samples investigated.

*Spiritus Aetheris Nitrosi.*—All four of the products assayed were acid. Three contained aldehyde. The preparations averaged a content of 1 per cent. of ethyl nitrite.

*Zinci Oxidum.*—Two of the three lots subjected to analysis possessed a slightly styptic taste, due to the presence of 0.7 per cent. and 0.27 per cent. of zinc sulphate. They showed 0.32 per cent., 1.16 per cent., and 0.257 per cent. of lead oxide. One contained carbonate. All were free from arsenic, cadmium, and silicate.

#### LACTOPHENINE.

According to a note in *Jour. de Pharm. et de Chim.* [5] 29, 415, lactophenine is related to phenacetine as follows:

Phenacetine is an acetyl derivation of parphenetidine.



Paraphenetidine.



Phenacetine.

Lactophenine is phenacetine in which the acetic residue is replaced by that of lactic acid; it is therefore a lactic residue of parphenetidine; it is a white inodorous powder, soluble in 330 parts of water. Dr. Jaksch has employed it in abdominal typhus. This remedy is administered in doses of 5 to 15 grains. A total of 90 grains may be administered in the course of a day. In the smaller doses it acts as an analgesic, in larger doses as an hypnotic.

1,739,081 troy ounces of gold were produced in the United States in 1893, having a coining value of 35,950,000 dollars. The silver during the same period amounted to 60,500,000 troy ounces, with a coining value of 78,220,450 dollars.

## EDITORIAL.

### THE AMERICAN PHARMACEUTICAL ASSOCIATION.

A detailed report of the proceedings of this Association, which met at Asheville, N. C., September 3, 1894, will be found on another page.

The work of the Association may be considered under the following headings:

(1) *General Sessions, including the President's Address*; (2) *Scientific Section*; (3) *Section on Legislation and Education*; (4) *Section on Commercial Interests*.

(1) *General Sessions*.—As usual, the President's address is a feature of the first meeting, and Professor Patch met the demand for something valuable and interesting from the executive head of the Association.

While we have nothing to say concerning the merits or demerits of his recommendations, yet is it not about time for this feature of the President's address to cease? It has grown to be a custom to have recommendations, and no President, in recent years, has had the independence to ignore this custom. The appointment of a committee to consider such recommendations always follows, and that committee usually finds itself in a difficult position, between fear of offending the President on one side and duty to the Association on the other. The result often is a non-committal report, which, after much discussion in the meeting, is so arranged as to "let the President down" without hurting his feelings. When reforms are so necessary as to be apparent, let the President suggest them; but, it usually being otherwise, he should not hunt for them. A brief review of the advancement in some department of science related to pharmacy would be of interest to most members, and give the President an opportunity to express his views.

(2) *The Scientific Section*.—The chairman of the Scientific Section did something of that kind this year by omitting the usual address, and it was to his credit. There were an unusually large number of papers contributed to this section (about fifty), a few only of which were of special merit. The great bulk of them were mediocre, and a number should be very carefully read by the committee on publication, and by them only, and not be allowed to appear in the Proceedings. A few years of natural selection with the survival of the fittest would exert a powerful influence in raising the value of the published Proceedings, and in adding interest to the meetings of this section.

(3) *Section on Legislation and Education*.—If the number of papers presented in the sessions of a section be an indication of its usefulness, then the meetings of this section ought to satisfy the most exacting critic. More than half a hundred papers were presented, but, owing to the liberality with which the discussion was conducted, comparatively few of them were read.

A large amount of the time was consumed in disposing of a resolution offered at Chicago last year by Prof. Hallberg. The negative report of the committee on that resolution, signed by S. A. D. Sheppard, Wm. Simon and C. M. Ford, is one of the most valuable documents which has been presented to the Association for a long time. The following quotation contains much concentrated good sense: "*The connection between the Association and the schools and colleges is one entirely of courtesy, and in no sense one of judicial authority.*" If the section had amended this so as to include *boards of pharmacy*, and then

remembered it, there might have been considerable time saved, instead of passing some similar resolutions this year.

To revert to the papers presented at the meetings of this section, it may be said that many of them were too lengthy to be read there; many more bear evidence of having been hastily "dashed off," and, as they were not read at the meeting, it is safe to predict that they will not be read except by the proof-reader, unless the before-mentioned committee on publication awakes to a sense of its duty. If ever there was an opportunity for a committee to do a creditable piece of work it is now offered to that body.

A very sensible plan was adopted by one or more members, who answered several or all of the queries proposed by the officers of this section, in one paper. Since some of the queries could best be answered by the words *yes* or *no*, and no labored argument could do more, this short method of disposing of them is to be commended. The section adjourned about midnight, after having exhausted itself over the question of what colleges of pharmacy should require of candidates for the degree of "Graduate in Pharmacy." Action was finally deferred until next year. It is hoped that in the meantime every member will read the report of the committee on Prof. Hallberg's resolution on a similar subject, which he offered at Chicago, and which they reported negatively at Asheville.

(4) *The Section on Commercial Interests* very properly took up the subject of alcohol taxation, and decided to submit recommendations to the Secretary of the Treasury, that no alcohol for internal use should be free from tax. This action may be a surprise to some, but it was shown that free alcohol for medicinal use would chiefly benefit the patent medicine manufacturer. If that be true, had not the Section better devote its energies to getting rid of the patent medicine manufacturer? He is becoming expensive. Then, too, we must ask, what has become of the amount of time and energy devoted by the Association in previous years to crying for free alcohol? We do not believe that free alcohol will drive any honest pharmacist out of the business, the dishonest ones should go anyhow.

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## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*A Text Book of Practical Therapeutics*; with special reference to the application of remedial measures to disease and their employment upon a rational basis.

By Hobart Amory Hare, M.D., B.Sc., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia. Philadelphia: Lea Bros. & Co., 1894, 8vo. Pp. 740. Price, cloth, \$3.75; leather, \$4.75.

It is with pleasure that we call the attention of the profession to the fourth edition of this valuable work, all four editions of which have been issued within four years of its first publication. In addition, its merits have caused it to be introduced as a text book into a number of the most prominent colleges of the country. The book is written in a lucid and accurate manner, without the excessive use of technical terms, and much of it might be profitably perused by the pharmacist. Special attention is called to the article on "Acute Opium Poisoning," which, in the absence of a physician, the pharmacist is sometimes

called upon to treat. The condition of the patient is very accurately described, and the treatment from the personal knowledge of the writer is very effectual. Other articles of much general interest are those on Antiseptics, Cold and Heat as Remedies, and Foods for the Sick. Among the new remedies mentioned are Chloralose, Condurango, Convallarin, Duboisine, Pyoktanin (Methyl Blue), and Pyrogallol (Pyrogallic Acid). Pyoktanin is stated to be of some value in surgery of the eye, but valueless as an antiseptic in general surgery.

Several of the aniline dyes have been sold under this name, but it would be better, as the author has done, to confine the name to methyl violet. In view of the fact that many of the headache powders on the market consist mainly of Acetanilid, attention is called to the article on that subject, in which it is stated that in some cases alarming symptoms have been produced by moderate doses (3-10 grs.), and in two cases death from excessive dosage. C. B. L.

*Chemistry, General, Medical and Pharmaceutical*; including the chemistry of the U. S. Pharmacopœia.

By John Attfield, M.A., Ph.D., F.I.C., F.C.S., F.R.S., etc., Professor of Practical Chemistry in the Pharmaceutical Society of Great Britain. Fourteenth edition, specially revised by the author for America, to accord with the new U. S. Pharmacopœia. In one royal 12mo volume of 794 pages, with 88 illustrations. Philadelphia: Lea Bros. & Co., 1894.

The present edition corresponds to the concurrently produced fifteenth British edition. It is probably the first pharmaceutical chemistry to appear since the issue of the new Pharmacopœia, and will be especially welcome on that account.

The author has found it necessary to add much new matter, and wherever possible he has eliminated some of the old, in order to keep the book within the limits of a student's manual.

There is much to be commended in this work of Prof. Attfield. While the arrangement of the material is not all that could be desired, yet we believe there is no book on chemistry printed that contains so much valuable matter condensed into such small space.

*The Journal.* Published quarterly by the Alumni Association of the Cincinnati College of Pharmacy.

This new accession to the ranks of pharmaceutical journals is to be devoted to "Pharmacy, Botany, Microscopy, Materia Medica, Chemistry, and to Pharmaceutical Education and Progress."

The Journal Board of Managers are C. T. P. Fennel, Julius H. Eichberg and Theodore Wetterstroem.

The first number takes a high standard, and we trust that the succeeding ones will be able to maintain this standard.

## AMERICAN PHARMACEUTICAL ASSOCIATION.

MEETING AT ASHEVILLE, N. C., SEPTEMBER 3-10, 1894.

*General Sessions.*—The first session was opened by an address of welcome by Mayor Patton, on behalf of the City of Asheville. This was replied to by Leo Eliel, the First Vice-President of the Association. The President, Edgar L. Patch, of Boston, then read his annual address.

He briefly reviewed the work of the association since its meeting in Chicago last year. The special Membership Committee, which he was directed to appoint had done good work.

Brief mention of the important events bearing on pharmacy, which have transpired since the last meeting was then made by the speaker. He touched on the rapid increase in new synthetic remedies, but left them to the careful sifting by the Reporter on the Progress of Pharmacy. The United States Pharmacopœia and the last volume of the Proceedings were then commented on. In reviewing the last meeting at Chicago, the president turned aside to briefly consider the criticisms made on American pharmacy by one of the English visitors, Mr. N. H. Martin. "We are quite aware," said Professor Patch, "that there is unlimited field for improvement in pharmacy here as in Great Britain, and are not surprised that our defects should be manifest to an interested and critical observer from abroad. Nevertheless it affords any of us, who have an active interest in pharmaceutical education, the deepest satisfaction to observe the great improvement in the quantity and quality of education offered to the American pharmacist, and to predict that our vantage ground is so well fortified and maintained that future progress must be more rapid." Following this are facts and figures which show that practical laboratory education is, in America, the rule and not the exception.

The difficulties which beset the pharmacist of to-day, and interfere with his making a bare living were then dwelt upon to considerable length.

The President recommended the publication and distribution by the Association of "An Observation Sheet." This consisted of heading concerning incompatibilities, processes of manufacture, etc., with blank spaces to be filled by the pharmacist giving the results of his observations.

He further recommended establishing an American Pharmaceutical Association Scholarship Fund of \$1,500 annually, for the purpose of securing to suitable candidates the advantages of higher education in pharmacy.

Finally, brief allusion was made to recent publications of pharmaceutical works, and to some to be issued.

It is sufficient to say of the suggestion in regard to a scholarship, that the Association did not see its way clear to adopt it.

Various reports from the committees were next read by title and laid upon the table. The reports of delegates were received. The Secretary of the council, Geo. W. Kennedy, reported that suitable resolutions, regarding our late Permanent Secretary, Prof. John M. Maisch, had been engrossed and contained the signatures of the members of the council, and were sent to the family of Professor Maisch. The Committee on Prize Essays (Professor Good, Chairman), reported that the first prize had been awarded to Chas. Caspari, Jr., and A. R. L. Dohme, for their paper on "The Value of Titration with Volumetric Acid Solution as a Means of Assaying Alkaloidal Drugs and Galenical Preparations." The second prize was awarded to Henry Trimble and J. C. Peacock, for their joint paper "On the Preparation of Oak Tannins, with Special Reference to the Use of Acetone as a Solvent." Both of these papers were printed in the Proceedings for 1893.

The finances of the Association are sound, but the Chairman of the Finance Committee, in conjunction with the Treasurer, cautioned the members of the different committees to be more considerate of their expenses. The use of the



initials "A. P. A." was discouraged for use on stationery, etc., and only sanctioned on the gold badges. There were various changes in the by-laws so as to make them conform to the resolutions adopted at Chicago. A resolution was passed compelling members dropped from the roll to pay the sum of \$15 before reinstatement to membership in the Association. Total membership at the time of the present meeting, 1,524. Honorary members, 18. New members proposed at meeting, 171. A Nominating Committee, to elect the officers for the ensuing year, was appointed, and the Association adjourned.

*General Sessions.*—Tuesday, September 4, 9 A.M. The report of the nominating committee was received and the candidates for the respective positions elected by the Association. The officers for the ensuing year are: President, William Simpson, Raleigh, N. C.; First Vice-President, Charles M. Ford, Denver, Col.; Second Vice-President, John N. Hurty, Indianapolis, Ind.; Third Vice-President, Joseph E. Morrison, Montreal, Quebec, Can.; Treasurer, Samuel A. D. Sheppard, Boston, Mass.; Permanent Secretary, Charles Caspari, Jr., Baltimore, Md.; Reporter on the Progress of Pharmacy, Henry Kraemer, New York. For membership of Council the following: W. S. Thompson, H. M. Whelpley, S. P. Watson and G. W. Voss. One hundred and seventy-one applications for memberships were proposed. These were, upon the vote of the Association, invited to complete their membership after their names had been posted in a conspicuous place. Report of committee on place of next meeting decided upon Denver, Col. This was unanimously adopted by the Association. Reports of the various committees were read. Credentials from nearly all of the States of the United States were received. Prof. C. Lewis Diehl made an extensive report of the work performed by the Committee on National Formulary. The defects in formulas at present incorporated therein were few and easily remedied. The number of desirable additions are small. A number of changes were read to make it conform to the U. S. Pharmacopœia, and wherever practicable, as in the case of Elixir Aromaticum, the U. S. P. initials will follow thereafter. Mucilage of acacia was directed to be used instead of the mucilage of Irish moss. Some corrections were made in the following preparations of N. F.: Elixir Chloroformi Comp.; Elixir Cinchonæ is to be made from the alkaloids; Elixir Bismuthi is to contain only citrate of bismuth and ammonia. Mistura Chloroformi et Opii was improved upon, and the general directions for making tablet triturates incorporated. In the manufacture of hypodermic tablets, cane sugar is to be employed as a basis. Elixir Paraldehydi is to be increased to 20 per cent. Improvements are also made in preparing Liq. Magnesii Citratis, Syr. Codeinæ Sulph. and Elix. Rhamni Purshianæ Arom. An epitome of the N. F. was also recommended to be prepared for the use of the physician. Professor Diehl also related a plan devised by the Kentucky Pharmaceutical Association for making the National Formulary a popular work among pharmacists. It consisted in having members prepare preparations in strict accordance with the N. F. and submit them at the annual meeting for the inspection of the members and others. About seventy members made preparations in this manner, and these elicited more attention than anything else when presented at the meeting of the Medical Association. It is suggested that this method might, with great value, be adopted by other State associations. Some of the samples submitted by the chairman at the American

Pharmaceutical Association meeting were of : Sal Carolinum Factitium (N. F. for Artificial Effervescing Carlsbad Salts), Elixir Ferri Phosphatis, Quininæ et Strychninæ, Elixir Gentianæ containing Tinct. Ferri Chloridi, Ext. Stillingiæ Fld. Comp., Elixir Bismuthi and Syr. Acidi Hydriodici Decolor. (colorless syrup of hydriodic acid).

In the report from the chairman of the American Pharmaceutical Association delegates to the San Francisco meeting of the American Medical Association, it was stated that one paper read by a physician claimed that more harm had been done by physicians dispensing than by the pharmacists furnishing medicines. The chairman of delegates to Pan-American Congress reported that the section of pharmacology had made a most favorable impression by reason of the number and character of papers presented to this Congress. The resolutions proposed by the Committee on the U. S. Pharmacopœia (H. M. Whelpley, Chairman) were adopted, viz.: Approval of the changes and character of the recent edition of the U. S. Pharmacopœia. That a table of maximum doses of energetic drugs be given in the U. S. Pharmacopœia. That as the recipe file is the only indication of the kind of medicines employed in the United States, it was suggested that the committee of revision of the U. S. Pharmacopœia obtain the co-operation of the State Associations in securing information concerning the ingredients entering into the recipes of the respective collaborators. It was furthermore moved that the American Pharmaceutical Association appropriate means if necessary to assist the work of the committee. A. E. Ebert presented a report of the work of the International Pharmaceutical Congress.

*Final General Session.*—Saturday, September 8th, 10 A.M., Prof. Oscar Oldberg, Chairman of the International Pharmaceutical Congress, informed the Council of the status of the publication of their proceedings. It was "Resolved that the balance of the appropriation of \$1,000 in favor of the International Pharmaceutical Congress be used to publish the Proceedings of the International Pharmaceutical Congress, and it was further resolved that the actual transactions of the Congress, such as votes passed and resolutions adopted touching important general principles be published in the German, French and Spanish languages, as well as English, but that the minutes of the Congress be published in English only. A special committee, consisting of S. A. D. Sheppard, J. P. Remington and O. Oldberg, was appointed with the power to determine how the money should be expended for said publication, and to decide upon distribution of the same. C. Caspari, Jr., moved "That the Council of the American Pharmaceutical Association tender to Joseph P. Remington the sincere appreciation of his efforts in the careful and thorough manner in which he has performed the duties of the office of Permanent Secretary *ad interim*. The transfer of the office, without an opportunity of consulting the late Prof. John M. Maisch, as to facts and methods, carried with it a vast amount of intricate work and labor which has been most satisfactorily executed by Prof. Remington. The council desires to place on record its sense of gratitude to Prof. Remington for his valuable services." This, by a rising vote, was unanimously adopted by the Association.

A motion was made by H. M. Whitney, and carried, to the effect that the American Pharmaceutical Association condemns the supplying of medicines to the physician by manufacturing houses for the use of putting up his own

prescriptions and that all dealings with such houses by members be discountenanced.

The Committee on President's Address recommended the adoption of the observation sheet proposed by Prof. E. L. Patch, and that the chairman of the section on scientific papers be instructed to have 5,000 forms printed for distribution and a report thereupon to be read at the next annual meeting. Regarding the question of a "Pharmaceutical Fellowship" to be established by the Association, while recognizing the value thereof, yet the Association was considered not to be in a financial position to take action thereupon at this time. Report of Committee on Centennial Fund, the chairman announced that \$50 had been appropriated during the past year for the use of Prof. E. Kremers, Madison, Wis., for prosecution of his work on Menthol.

#### SECTION ON SCIENTIFIC PAPERS.

Chairman L. E. Sayre called the meeting to order on Wednesday evening, September 5th, at 9 o'clock. He presented a large (two feet long) specimen of the root of *Cucurbita perennis* (man-in-the-earth), which was obtained in Western Kansas, and said to contain a bitter principle. A chemical analysis would be made during the forthcoming year. Paper on *Rhus toxicodendron* was read by H. M. Whelpley. The question was, whether the poisonous constituent was destroyed by drying. It is not wholly destroyed. Out of 36,000 recipes examined by A. E. Ebert, but five called for *Rhus toxicodendron*. Thirty-four remedies for *Rhus* poisoning are to be found in medical works.

Discussion: Dr. Bartley stated that he had been poisoned by the dried plant in winter. J. U. Lloyd stated that different people were differently affected, and told of a lady who was poisoned by simply being in the room when bottles were being filled with the tincture. She was never poisoned by the dried *Rhus toxicodendron*.

A further discussion upon the paper revealed but little that was new. Prof. Patch said that a preparation of Resorcin, Glycerin and Gelatin applied locally every six hours, proved to be exceedingly efficacious in thirty-six hours, in the case of a man severely laid up for several days. Constitutional treatment, however, seems to be necessary after the poison enters the circulation.

*Examination of Kola*.—C. O. Topping. Six samples of kola were examined for total alkaloids, for separate alkaloids (caffeine and theobromine), also for tannin. Three methods for estimating total alkaloids were employed, viz.: (1) Heckel's; (2) Squibbs; (3) Modified Prollius. Lowenthal's method of estimating tannin was adopted. The author also performed experiments to prove indirectly the presence of a ferment in kola which, acting upon a glucoside "kolanin" under suitable conditions of heat and moisture, produces *caffeine*, *glucose* and *kola red*. The paper is accompanied by a tabulated statement of the results obtained.

*Reduced Iron* (the quality dispensed by pharmacists).—G. C. Stevenson. The work confines itself mainly to the per cent. of metallic iron in the free and uncombined state, the per cent. of insoluble residue, together with the question of impurities within specified limits. Of ten samples analyzed, only three were equal to or above the standard (80 per cent.) for uncombined iron as required by the Pharmacopœia. The remainder were from 16 to 60 per cent. below standard, while two contained from 2 to 5 per cent. less of total iron than that

required of the free uncombined iron. "From these analyses it appears that the preparation is of a very inferior quality, and presents an item which should not be treated lightly by pharmacists." A tabulated statement of results accompanied the paper.

*White Castile Soaps.*—Samuel R. Knox discussed the materials from which soap is made. The analyses include :

- (1) Estimation of water.
- (2) Estimation of unsaponified matter.
- (3) Estimation of the relative proportions of fatty acid and alkali.

The author concludes that white castile soap of the market is highly adulterated with other oils. Tabulated results of the analyses of eight samples of white castile soap follow.

*A Microscopical Study of Cicuta Maculata.*—F. Lyle Robertson has investigated the structure of the root. The paper is illustrated by seven drawings.

*Glycerin of the Market.*—J. L. Tegarden examined thirteen samples of all grades and brands and has tabulated the results as follows :

Specific gravity, dextrose and sugar, fixed impurities, acids, salts (calcium), chlorides, arsenic.

*Experimental Work on the Solvent Power of Alcoholic Menstrua.*—L. D. Havenhill. "The laboratory notes on 'The Variation of Menstrua in Fluid Extracts,' by Prof. E. L. Patch, appended a suggestion that we might enter upon an interesting and beneficial line of experiments to determine the menstrua best adapted for obtaining the active principles of drugs free from their inert extractives. Accordingly, a series of experiments were made on ten of the most potent medicinal drugs, using menstrua of varying proportions of alcohol and water." "No general relation was found to exist between the per cent. of extractive and the per cent. of alkaloids." The author concludes: "It was very gratifying to note that the menstrua directed by the present Pharmacopœia were, in nearly every instance, the ones best fitted for extracting the active principles of the drugs on which the experiments were made." Three very complete and valuable tables accompany the work.

*Notes on the Behavior of Albuminate of Iron and Ferratin with Artificial Gastric Juice.*—J. O. Schlotterbeck and S. R. Boyce. In a recent paper read before the Cincinnati Academy of Medicine, by Dr. G. A. Fackler, the following advantages of ferratin over all other artificial albuminates of iron are claimed :

(1) In ferratin we have a compound which, because of the fact that it is not altered in the stomach or intestinal tract, is wholly absorbed and made available.

(2) Ferratin, due to the intimate union between it (iron) and the albumin, is so slowly attacked by the sulphuretted hydrogen, that it is absorbed before an alteration into the sulphide can occur.

(3) Since, as a rule, the food which we ingest has been subjected to heat during the process of its preparation, and since in the above process (that of separating the natural iron compound from pig's liver) no other force but heat has been employed, we undoubtedly secure in this compound that form of iron which enters the stomach with animal food, and which is, in part, absorbed and deposited in the various organs.

The results of analyses of albuminate of iron and ferratin, as made by the authors, are given below :

*Albuminate of Iron.*

Pale red powder.

Iron 2.1 per cent.

Insoluble in water.

Soluble in dilute alkalis.

Soluble in dilute acids.

With  $(\text{NH}_4)_2\text{S}$  begins to blacken in 5 seconds.

Pepsin and HCl convert 43 per cent. of the iron into ferrous and ferric chloride by one digestion.

By removing the peptones, etc., and subjecting to second digestion, 42 per cent. more of the iron is converted into the inorganic form, or a total of 85 per cent. of the original iron.

The author claimed that Ferratin possesses no great advantages over ordinary albuminate of iron.

*Ferratin.*

Dark brown powder.

Iron 5.4 per cent.

Insoluble in water.

Soluble in dilute alkalis.

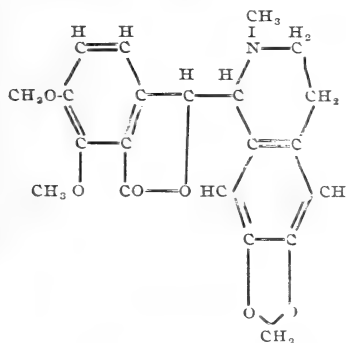
Soluble in dilute acids.

Begins to blacken in 20 seconds with  $(\text{NH}_4)_2\text{S}$ .

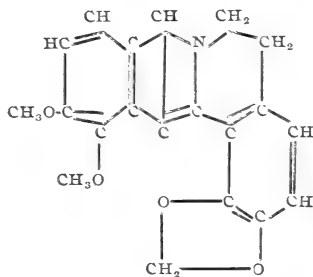
Pepsin and HCl convert 37 per cent. of the iron into ferrous and ferric chloride by one digestion.

By subjecting to same operation, 43 per cent. more of the iron is converted into the inorganic form, or a total of 80 per cent. of the original iron.

*Queries 14 and 15.*—The relation of hydrastine and berberine to one another, and their mode of combination in the drug. To illustrate the relation of the two alkaloids, Alfred R. L. Dohme referred to the following graphic formulas constructed by Freund :



HYDRASTINE.



BERBERINE.

Being unable to find an acid in hydrastis, which yields the alkaloids as such to cold ether and benzene, the author concludes that these principles exist in the free state.

*Discussion.*—Dr. Greve suggested that the white alkaloid was made known first in this country, and the yellow alkaloid shortly afterwards in Europe.

J. U. Lloyd remarked that Rafinesque, in 1828, called it hydrastine and suggested that there arose a misunderstanding of the word. The white hydrastine of those days became known later as the yellow berberina.

Dr. Dohme, in explanation, suggested that neither was pure, and that such a statement as one being superseded by the other, referred only to the name ;

as the impure white alkaloid, *hydrastina*, became known, the impure yellow alkaloid, *berberina* was shown to be also present, and an active principle. The result was that people generally adopted the name *berberina* for the alkaloid of *hydrastis*, substituting it for *hydrastina*.

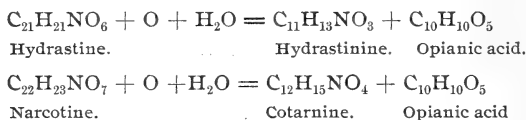
J. U. Lloyd desired to know if the experiments were made with dry or fresh *hydrastis*, as drying might result in an alteration of the construction of the constituents.

Dr. Dohme replied that he employed the dried drug, but that he hoped to experiment with the fresh drug before the next meeting.

C. S. N. Hallberg wished to ask Dr. Eccles why *hydrastinine* was inserted into the U. S. P. and not *hydrastine*.

Dr. Eccles replied that both were intended to be inserted and that both were employed in Brooklyn and New York, and that *hydrastinine* was found to be more efficacious and used in smaller doses.

Dr. Dohme showed that *hydrastinine* was a decomposition product of *hydrastine*, just as *cotarnine* was the same of *narcotine*, as follows :



Chas. Caspari, Jr., exhibited a new suppository mould.

*Powdered Extracts.*—C. S. N. Hallberg has made a full series of extractions with alcohol, methyl alcohol and a mixture of alcohol and chloroform in varying proportions. The best results were obtained by the use of a mixture of alcohol 75 cubic centimetres and chloroform 25 cubic centimetres. The percentages of extracts obtained ranged from 6 per cent. to 15 per cent. In every case, the extract, when mixed with sufficient milk sugar to make one-fourth the weight of the drug, furnished a nice-appearing, homogeneous powdered extract, which, from present indications and from the comparatively small percentage of extracts contained in them, will retain the pulverized condition, with ordinary care, for any reasonable length of time. The author suggests that this class of preparations replace the abstracts, and suggests the term "quatract" (already proposed by the author, Proc: xxxvi., page 105) as a synonym. This would tend to draw attention to the strength of the preparation.

*Laboratory Notes*, a contribution by Prof. E. L. Patch, treated of the quality of hydrogen dioxide, carbolic acid and reduced iron.

Of thirty samples of commercial hydrogen dioxide examined, about one-half were standard as regards the U. S. P. requirement for available oxygen. All were too strongly acid to be official. Ten samples for medical use were found to be of fair quality.

Carefully conducted experiments with the official process yielded the contributor good products.

To test the assertion that best results are gotten from a concentrated solution obtained by evaporating the official solution to one-third its volume, a series of experiments were made, the results of which showed that by this means a stronger solution could be obtained, but not without loss of oxygen,

which sometimes amounted to one-third of what the concentrated solution should represent. Attention was directed to the occurrence of water in high-grade carbolic acid which was sold as official. Lowered fusing and boiling points were mentioned as indications of its presence.

Examination of ten samples of reduced iron, including both gray and black, showed considerable variation. None contained sufficient metallic iron to be official, although several were so labelled.

*Additional experiments with Datura Stramonium* were contributed by Alfred R. L. Dohme, who drew the following conclusions :

(1) That the stems of *Datura stramonium* contain more alkaloid than the leaves.

(2) That the plant *Datura stramonium* gathered in June contains less alkaloid than that gathered in July and August.

(3) That Keller's method extracts more alkaloid from the drug than Dragendorff's method does.

This gentleman also submitted a discourse on the *relative alkaloidal value of two kinds of ipecac root*, known as "fancy" and "wiry." The former is the annulated variety and is the root proper, while the latter is that part of the root which merges into the stem. In a given weight, the "wiry" shows more cortex, which, being the seat of the alkaloid, makes this variety richer in emetine than the "fancy."

In another paper the same author answered the query : *What is the quality of the reduced iron dispensed by pharmacists ?*

After examining numerous samples of both black and gray, the latter of which usually contains the larger amount of metallic iron, he reported that the article usually sold is not of standard quality on account of the presence of considerable oxide and sulphide.

The following table gives representative compositions expressed in percentages :

Product.	Inorganic residue insol. in hydrochloric acid.	Organic residue, insol. in hydrochloric acid.	Total iron, determined as ferric oxide.	Iron combined as sulphide, determined as sulphate and calculated as ferrous sulphide.	Uncombined iron, determined by the U. S. P. method.	Iron combined as oxide, difference between total iron and the sum of free and combined as sulphide.	Shortage regarded as carbon lost as carburetted hydrogen in dissolving the iron.
R	0.4	0.5	98.5	0.00	83.0	15.5	0.6
W	1.17	1.81	82.2	9.3	47.0	25.9	14.82
I	1.63	1.23	97.8	2.1	92.0	3.7	0.00
B	1.65	1.0	85.8	18.8	35.0	32.0	11.55
S	1.67	1.58	96.0	8.27	68.0	19.73	0.75

*Improved working formula, number 27, National Formulary*, was the subject of a paper by Samuel C. Davis, who has found the following method satisfactory for the preparation of Elixir of Valerianate of Ammonium.

Add 3 fluidrachms water of ammonia U. S. P. to 5 fluidrachms of water, and in this dissolve 256 grains ammonium valerianate, which solution is now added to 12 fluidounces of aromatic elixir; then add chloroform, tincture of vanilla, and compound tincture of cudbear (in quantities as per N. F.), and agitate; now add q. s. aromatic elixir to make 16 fluidounces.

*A method for the estimation of mono- and bicarbonate of sodium in commercial bicarbonate of sodium* was submitted by Prof. W. T. Wenzell. After the estimation of the mixed carbonates, the amount of each is ascertained by a carbon dioxide determination simply—the process being based on the following data:

(1) The percentage amount of carbon dioxide contained in sodium bicarbonate =  $52.38095$ .

(2) The percentage amount of carbon dioxide contained in sodium mon carbonate =  $41.50943$ .

(3) The difference between the two percentage amounts of the two carbonates,  $52.38095 - 41.50943 = 10.87152$ .

(4) A factor representing 1 per cent. of this difference,  $10.87152 \div 100 = .1087152$ .

From the foregoing amounts the following data have been proposed for formulating the analytical process:

A. = Percentage amount of  $\text{CO}_2$  obtained by the actual analysis of the sample.

B. = Theoretical percentage of  $\text{CO}_2$  contained in the sample, calculated as  $\text{NaHCO}_3$ .

C. = The difference between the respective amounts of A and B.

D. = The factor representing 1 per cent. of the difference of the amounts of  $\text{CO}_2$  contained respectively in  $\text{Na}_2\text{CO}_3$  and  $\text{NaHCO}_3$ .

E. = The percentage amount of  $\text{Na}_2\text{CO}_3$ .

F. = The percentage amount of  $\text{NaHCO}_3$ .

G. = The total percentage amount of mixed carbonates in the sample.

#### FORMULA.

$$A. - B. = C.$$

$$C. \div D. = E. (E. = \text{Na}_2\text{CO}_3.)$$

$$E. - G. = F. (F. = \text{NaHCO}_3.)$$

*Analytical Alkaloidal Chemistry.*—Lyman F. Kebler, after reviewing the development of the various methods of extracting, separating and estimating these principles, discussed *the relative value of gravimetric methods, Mayer's reagent and tritration with volumetric acid solutions in assaying alkaloidal drugs and galenical preparations.*

A table of the results of the three methods is given for the more frequently used alkaloidal drugs, an examination of which shows the mean percentage results obtained by the use of volumetric acid to be in most cases about ten per cent. lower than those from the gravimetric method. Uniform success was not had by use of Mayer's reagent.

The adoption of a certain method, both for the extraction of the alkaloid and the titration with a volumetric acid solution, is recommended to insure uniform results with every drug.



Under the title of *Alligation in pharmaceutical calculations—its usefulness and limitations*, Prof. T. D. Reed treated of this arithmetical principle to which the introduction of standardized drugs has directed some attention. The limitations of its applications under certain conditions were demonstrated by problems.

*The official process for spirit of nitrous ether* was discussed in a paper by Chas. M. Ford, in whose hands it was neither satisfactory nor economical. Some modifications and suggestions of practical value were offered to make the process more feasible.

Supplementary to a paper read at the meeting of the Association in 1893, Prof. L. E. Sayre presented *Further notes on taraxacum root*, recording the difference between the drug collected from upland and that gathered in low-land. The analysis of fresh root, and of the same after being dried at 50° C., showed practically no change in the amount of taraxacin, resin and reducing sugar.

Incineration of the well-dried crude inulin, which is precipitated when a concentrated aqueous extract of taraxacum is mixed with alcohol, showed 91 per cent. of organic matter; while boiling with dilute hydrochloric acid and treatment with Fehling's solution indicated 79.02 per cent. of inulin.

J. B. Nagelvoort, in a paper detailing the preliminary preparation of the material to be examined and the plan of applying the solvent, recommended *The use of isobutylic alcohol for the detection of morphine and codeine* in pharmaceutical preparations and patent medicines, as preferable to amyllic alcohol, which is so disagreeable to handle. The solution of the material to be examined is made alkaline with ammonium hydrate, and agitated with successive portions of isobutylic alcohol, which is separated and evaporated.

The same author, in another contribution, *The testing of arsenic of the U. S. P.*, pointed out the mistakes that might occur from following the directions given by the Pharmacopœia, to use tin-foil in applying Bettendorf's reaction for the detection of arsenic in tartar emetic. The black precipitate of metallic antimony produced would obscure any reaction that might be due to arsenic.

The author states the reaction to be reliable if the tinfoil is omitted.

*Quantitative determination of some substances in aqueous solution by means of the refractometer* was treated of at length by W. F. Edwards. The method of taking the readings was as follows: The glass-stoppered flasks containing the solutions were placed in a tray, through which water circulated from the hydrant in the room. The prism of the refractometer was also placed in the tray. After the water from the hydrant became constant in temperature, and the temperature of the prism and solutions had become the same as that of the water, the prism was taken out, hastily wiped dry and placed on the instrument, with some of the solution to be investigated. The reading was taken as quickly as possible, and the prism again placed in the tray. This was again taken out and, as before, quickly wiped dry and another solution used. The time required for taking a reading after the solution was taken from the tray was probably not more than ten seconds. The duplicate readings did not vary much. The substances determined were hydrochloric, acetic, sulphuric

and nitric acids, ammonia and alcohol. Titration and specific gravity were employed to furnish solutions of definite strengths. The indices of refraction for sodium light of the substances in the different dilutions are given in tables for comparison with the specific gravities and per cent. content.

In some instances the increase in the number that represents the index of refraction was quite regular for each per cent. of increase of the substance in solution; in others it becomes less uniform the higher the percentage runs. Tables have been calculated from the average increase and give the per cent. of content in whole numbers, compared with the index of refraction.

When the differences in the latter, for a difference of 1 per cent. in content, are too small and variable to be of practical use—as is experienced in the estimation of nitric acid, above 60 per cent.; acetic acid, above 60 per cent.; and sulphuric acid, above 80 per cent.—it becomes necessary to take the reading on the refractometer, as usual, then add to the substance from one-fifth to one volume of water, and take the reading again at the same temperature. The dilution must be adjusted low enough to admit of reading on the instrument and reference to the table. In the determination of alcohol, when the index 1.36000 (which indicates about 40 per cent. content) is exceeded, considerable variation occurs.

A paper on *Hydrocymenes and Derivatives*, by Prof. Edward Kremers, treated of the constituents of volatile oils, many of which may be considered as derived, directly or indirectly, from *i-cymene*,  $C_{10}H_{14}$ , a hydrocarbon which occurs in a number of these oils, such, for instance, as those of thyme and *Cicula virosa*.

A synopsis of the new nomenclature as applied by Baeyer to the older names and of the number of possible isomers may be stated as follows:

*Hydrocarbons*.—Terpane, Hexahydrocymene,  $C_{10}H_{20}$ . Of this we have only one structure.

Terpenes, Tetrahydrocymenes,  $C_{10}H_{18}$ . Six are possible.

The two known are carvomenthene and menthene.

Terpadienes, Dihydrocymenes,  $C_{10}H_{16}$ . Fourteen structures can be formed for this class.

Pinene and camphene are placed in a separate group by Baeyer.

*Alcohols*.—Terpanols, Hydroxyhexahydrocymenes,  $C_{10}H_{19}OH$ . Seven isomers are possible. Terpan-3-ol is ordinary menthol.

Terpenols, Hydroxytetrahydrocymenes,  $C_{10}H_{17}OH$ . Of these there are forty-three isomers possible.

The terpeneols belong to this group.

Terpadienols, Hydroxydihydrocymenes,  $C_{10}H_{15}OH$ .

Eighty-seven structures can be produced to represent their constitutions.

Terpadiols, Dihydroxyhexahydrocymenes,  $C_{10}H_{20}O_2$ .

Twenty-four diatomic alcohols of this class are possible. Terpin is the representative.

*Ketones*.—Terpanones, Keto-hexahydrocymenes,  $C_{10}H_{18}O$ .

Of these there are but two, carvomenthone being the  $\alpha$ -ketone and menthone the  $\beta$ -ketone.

Terpenones, ketotetrahydrocymenes,  $C_{10}H_{16}O$ .

Eleven  $\alpha$ -ketones of this type are possible and an equal number of  $\beta$ -ketones.

Dihydrocarvone is representative of the former class and pulegone of the latter.

Terpadienones, ketodihydrocymenes,  $C_{10}H_{14}O$ .

There are possible fourteen  $\alpha$ -ketones and fourteen  $\beta$ -ketones of this class. Carvol, envarcol and isocarvol are members of this group.

*Phenols*,  $C_{10}H_{13}OH$ . Carvacrol and thymol are these.

The above review shows the complexity of the cases of isomerism to be expected from this class of bodies. The author recommended some such system of nomenclature as that recently suggested by Baeyer.

The contribution also embodied some original work with the derivatives of menthol by means of which the secondary alcohol group was shown to be in ortho position to the carbon atom in connection with the propyl group.

*Do the so-called elegant preparations of cod-liver oil, from which the oil has been removed, possess any therapeutic value?* Henry A. Stearns and F. E. Stewart each submitted a paper intended to answer this query.

The paper on *Examination of preparations of cod-liver oil for alkaloids of cod-liver oil*, by J. O. Schlotterbeck, possibly belongs with the two above-mentioned contributions, but, as it was not printed in time for the meeting, we have been unable to obtain a copy.

Officers of this section :

Chairman, A. R. L. Dohme, Baltimore, Md.

Secretary, Geo. B. Kauffman, Columbus, O.

Associate, to be selected by these two.

#### SECTION ON EDUCATION AND LEGISLATION.

*First Session Friday, September 7, 1894, 10 A. M.*—The chairman, R. G. Eccles, delivered his annual address, which was moved to be referred to the Publication Committee, and that a committee of three be appointed to consider the recommendations contained therein.

#### REPORT OF COMMITTEE ON RESOLUTION OFFERED BY PROF. C. S. N. HALL-BERG, AT CHICAGO, AUGUST 17, 1893.

"At the meeting of the Section on Pharmaceutical Education and Legislation in Chicago last year, the undersigned were appointed a committee to consider and report on the following resolution :

'Resolved, That the following conditions shall determine what constitutes recognized Colleges of Pharmacy, that is, the requirements for graduation are: (1) Age, 21 years; (2) Experience in pharmacy four years, including time at college; (3) Two courses of at least six months each, extending over more than one year.' See 1893 Proceedings, page 277.

"As soon as the Committee began to consider carefully the character and full scope of this resolution, they realized that action upon it might be very far-reaching in its effects, upon both the American Pharmaceutical Association and the Pharmaceutical Schools of the country.

"They therefore requested that they might have a year in which to consider the matter before making their report. And now that they are about to present that report, they confess to a feeling of deeper anxiety concerning the matter

than they did a year ago, and they urge the Association to be very careful in its action on the subject.

"While many of us have very strong convictions in regard to the matters referred to in this resolution, we must, for the moment, allow these convictions to remain unexpressed, and strive to answer the following, which is the only real question now before us: What position should the American Pharmaceutical Association take in regard to Prof. Hallberg's resolution?

"The connection between the Association and the schools and colleges is one entirely of courtesy, and in no sense, one of judicial authority. Nevertheless, the connection is a very strong one, and the Association on the one side, or the schools on the other, can, very materially, help or retard the good work that all are doing in the cause of pharmaceutical education. Now, what action can the Association take on this subject that will give the most help to pharmaceutical education, as represented in this country to-day? It would seem to be for the best that the Association should be a common meeting-ground for all; that there should be, at all times, on this common meeting-ground, such full and friendly discussion of methods as shall stimulate, benefit and teach, without producing friction or bitterness of feeling.

"It is very plain that the Association has no judicial rights to exercise. While most of the active workers in the schools are members of the Association, they are members simply in their personal capacities, and not by virtue of their connection with their schools. Nor, can it be said that the Association is an association of schools. It is simply a body made up of individual members. Therefore, it would seem that the American Pharmaceutical Association has no right to set itself up as a judge of what should be considered a regular, or recognized, or reputable, or good or bad, college of pharmacy. Should the colleges and schools of the country, acting in concert, present the question to the Association for answer, then we might, very properly, take a decided position in regard to it. But for us voluntarily to pass a resolution of such a strong and positive character, censuring the course pursued by pharmaceutical schools standing high in the work of pharmacy, would, in the judgment of your Committee, be very doubtful policy.

"The Committee, however, believe that the position of the Association is such that resolutions of a suggestive or advisory character, if passed by a two-thirds or three-fourths vote, may be of great help to the various schools, because such resolutions would probably express the prevailing opinions of the majority of the best men engaged in our line of work in this country, and the American Pharmaceutical Association is, practically, the only medium through which such information can be obtained.

"Your Committee, therefore, recommend that the resolution offered by Prof. Hallberg be not adopted.

"They also recommend that the Association adopt one of the following resolutions, provided that three-fourths of all the votes cast shall be in the affirmative:

#### FIRST RESOLUTION.

"*Resolved*, That it is the sense of the American Pharmaceutical Association that the cause of pharmaceutical education would be advanced, should all pharmaceutical schools that confer the degree of graduate in pharmacy, adopt the following suggestions:

(1) That the standard for admission to the school shall be not less than that required for admission to the public high schools of the country.

(2) That each student shall attend not less than two (2) courses of lectures, each course extending over a period of not less than twenty-two (22) weeks, the student to be in attendance upon not less than six (6) lectures in each week, and not less than one hundred and fifty (150) lectures in each session. That these lectures embrace those upon Pharmacy, Chemistry and Materia Medica, but do not include lectures upon Microscopy, Botany, Latin and other useful branches. That not less than one hundred and fifty (150) hours of practical work, and more, if practicable, should be required of each student, to be apportioned throughout the various courses as may seem best.

(3) That every student, in order to graduate, should be familiar with all the teachings of the Pharmacopœia, and fully capable of performing all operations mentioned in it.

(4) That the course of study shall not be forced, but shall be such as to allow for the proper digestion and assimilation of the instruction given in the school.

(5) That, as far as practicable, students shall give their whole time to college work during the sessions of the school, and not divide their time between work in a store and work at college. That no student shall be retained at school whose outside duties will not permit him to do full justice to his studies or to the laboratory work assigned him.

(6) That the degree shall not be conferred upon any person who is less than twenty (20) years of age at the time of completing his final course at school.

(7) That the degree shall not be conferred upon any person who has had less than three (3) years' practical experience in a good drug store, where physicians' prescriptions are compounded, exclusive of the time spent at college.

#### SECOND RESOLUTION.

"*Resolved*, That a Committee be appointed, consisting of one representative from each of the colleges and schools of pharmacy of this country, represented by members in this society, with three members of the Association, neither of whom are teachers in any pharmaceutical college or school. The duty of said Committee shall be to take into careful consideration the condition of pharmaceutical education in this country, make recommendations relative thereto, and report to the Association at its next annual meeting."

S. A. D. SHEPPARD,  
WILLIAM SIMON,  
CHAS. M. FORD,  
*Committee.*

After considerable discussion by S. A. D. Sheppard, Wm. Simon, C. M. Ford, C. S. N. Hallberg, O. Oldberg, L. E. Sayre, the second resolution was adopted as recorded—the words "represented by members in this society," to follow the words "of this country."

*Should Pharmaceutical College Students Divide their Time between the School and the Shop?* By O. Oldberg.—This paper was discussed at great length. J. P. Remington remarked upon the advantages of the pharmacist as being able to secure his education and practice his profession at the same time. We must have the help of the shop. No college at present is sufficient to educate a man entirely aloof from the store. He argued that, whether the student is

under disadvantages by studying in college and working in a store simultaneously depends upon circumstances. With a good preceptor, in a large city, there are unquestionable advantages. C. S. N. Hallberg referred to the value of habits referred to in the address of Dr. Eccles—habits of cleanliness, neatness, accuracy, adaptability, etc., which are to be formed only in the shop. He remarked how difficult pharmacists found it to-day to secure clerks with such habits, that they can adapt themselves to store work. When the degree is given, the graduate should have had his practical experience. No preliminaries of experience should be secured before theoretical education, and the advanced experience might go hand-in-hand with the theory. S. A. D. Shepard showed the practicableness of having the student in touch with the store during his entire course. A. E. Ebert argued that the first requirement of a student should be that he must possess two or three years' practical experience in a drug-store. After that the clerk is ready for theoretical instruction. The older countries are an example to us in this direction. Dr. Dohme contended that the requirements to-day of a pharmacist are higher than those required twenty years ago. O. Oldberg believed that store experience is necessary, but that the college is not the place to secure it. One thing only can be acquired at a time. Dr. Dadd believed that the young man is not educated in the store of to-day, and that it is necessary for him to go to college. Prof. Patch related his experience, that he knew of many students who received more instruction in one year in practical pharmacy in a college than in ten years in a store.

It was moved by H. R. Slack that "graduates in pharmacy be required to pass the State Board of Pharmacy examination before being registered." This was seconded and carried. Mr. Simpson, presented to the association the resolution passed by the International Pharmaceutical Congress, and after being seconded by O. Oldberg was unanimously approved. Upon motion it was ordered that a copy of the resolution be sent to the secretary of each state association.

"*Resolved*, That it is the sense of this association that no person should be admitted as an apprentice in pharmacy unless he shall have given evidence by satisfactorily passing a preliminary examination or otherwise, that he possesses a general education sufficient for such apprenticeship, and as advanced as the conditions of the practice of pharmacy in the United States permit, and his term of apprenticeship in pharmacy should in no case be counted so far as it may antedate such evidence of sufficient preliminary education.

"*Resolved*, That the period of apprenticeship in pharmacy ought not to be less than four years, including the time devoted by the apprentice to regular attendance upon the courses of instruction in a pharmaceutical school.

"*Resolved*, That this association approves the establishment of a compulsory curriculum of pharmaceutical education and holds that no person should be regarded as a qualified pharmacist who has not pursued to completion a systematic course of instruction in chemistry, pharmacognosy and pharmacy."

A resolution was framed by Mr. Payne relative to securing increased standing for the pharmacist employed by the United States Government. This was referred to the Association and favorably acted upon.

Officers for the ensuing year of this section are :

Chairman, Jas. M. Good, St. Louis, Mo.  
Secretary, C. S. N. Hallberg, Chicago, Ill.  
Associate, J. H. Beal, Scio, O.

The section adjourned at 12 P.M., and it was suggested that in the near future the Association must extend the time of its meetings in order that the papers on educational matters be considered.

*Section on Commercial Interests.*—The first session was almost entirely occupied with the question of free alcohol, and, after a lengthy discussion, which grew very warm at times, it was decided to appoint a committee to report at a future session. The second session was at first devoted to the "cutter," but later the free alcohol question came up, and a set of resolutions were presented, of which the vital one was as follows: "That the payment of rebate on internal tariff on alcohol, under section 61 of said act, be confined to alcohol used in the manufacture of those products in which the alcohol used is so changed as to lose absolutely its chemical and physical properties, including the class of chemical compounds known as the ethers, chloral and chloroform." After much discussion the resolutions were adopted. Geo. J. Seabury was elected chairman, and L. F. Chalin secretary of the Section for the ensuing year.

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## OBITUARY.

Wm. Norwood Needles, Ph.G., Class 1845, died at his residence in Germantown, Tuesday morning, April 17, 1894, aged 70 years. He was born in Philadelphia, his father being Edward Needles, who kept a drug store at Twelfth and Race Streets. In his early years he adopted his father's profession and attended the Philadelphia College of Pharmacy, graduating in the Class of 1845. After a few years devoted to the drug business, he relinquished it and became connected with the oil firm of Allan & Needles, carrying on business at Delaware Avenue above Chestnut Street for more than twenty-five years. In 1874 he retired from business, removed to Germantown, and devoted his time to his garden and the cultivation of flowers, of which he was extremely fond. He was a devoted husband and father. His wife and one daughter survive him, the latter being the wife of Frederick J. Kimball, President of the Norfolk and Western Railroad. The late Caleb H. Needles, Ph.G., who was formerly proprietor of the pharmacy at Twelfth and Race Streets, was a brother. His remains were interred in Laurel Hill Cemetery.

Ernest Bartram, Ph.G., Class of 1867, died at Brooklyn, N. Y., on Wednesday, May 9, 1894, in his forty-eighth year. He learned the drug business with Thos. S. Wiegand, Ph.G., at Fifteenth and Race Streets, and when Mr. Wiegand sold his store he remained with Samuel T. Jones, Ph.G., the purchaser, and graduated from the College in 1867. After his graduation, he entered the employ of Bullock & Crenshaw, at Sixth and Arch Streets, for a short period, and becoming tired of the drug business, he abandoned the profession and went upon the stage, and was a very successful actor of old men's parts. He was a member of Wm. Gemmill's Stock Company in the old Chestnut Street Theatre, and afterwards was "on the road" with a number of theatrical companies. His last appearance in Philadelphia was with the Roland

Reed Company. He was well liked by the members of his profession. His remains were brought to Philadelphia and interred at Laurel Hill Cemetery, Saturday, May 12, 1894. He was an active member of the Alumni Association of the Philadelphia College of Pharmacy and also of the Actors' Order of Friendship.

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## NOTES.

We do not believe it would be an exaggeration to say that the phosphate of Florida amounts to more in value than the coal and iron of Alabama or Pennsylvania. Certainly it is more valuable than the gold of California. If Florida had no other resources, this alone would make her one of the richest States in the Union. As a matter of fact, however, it is only one of many.—*Florida Facts*.

Speaking of the moss industry, the *Florida Citizen* says: The statistics compiled by the State Agricultural Department show that while this is yet an "infant industry," about 50,000 bales are annually exported from the State, bringing a return of not less than \$400,000. There is no good reason why these figures should not be multiplied ten times. The business is one requiring little capital, and the proportion of profit is more than can be realized from most sources with the same investment.

Rice is rapidly becoming a staple and profitable crop in St. Johns County, Florida. One farm of especial interest, as demonstrating the agricultural possibilities of the county, is that of Mr. H. M. Flagler, of New York. It is in the little town of Hastings, not far from St. Augustine, and is under the management of Mr. Mott. There has just been harvested from the farm 1,200 bushels of as fine quality of rice as can be grown anywhere in the world. This is the first crop from the land after the clearing, and it marks the beginning of rice culture on an extensive scale in several of the east coast counties.—*Florida Agriculturist*.

According to *Garden and Forest* (September 26, 1894), some of our native persimmons have been received in New York from Decatur County, Indiana, which were picked before there was any sign of frost, and yet he pronounces them entirely free from anything like the astringent or puckery quality generally supposed to be characteristic of this fruit until it has been chilled out by a good freezing. These persimmons were pronounced superior in flavor to any of the Japanese kinds; they averaged in size about an inch and a quarter in diameter, and were almost seedless. They were richer than many of the popular varieties of plums, and, if any objection to their quality could be noted, it was that they were too sweet. There can be no doubt that by selection, and, perhaps, by hybridizing with the foreign varieties, our native persimmon could be developed and improved into one of the most luscious of fruits.



# THE AMERICAN JOURNAL OF PHARMACY.

NOVEMBER, 1894.



## NOTES ON SOME OF THE CHEMICAL PROPERTIES OF THE MYDRIATIC ALKALOIDS.

BY THEODORE G. WORMLEY, M.D.

Several different alkaloidal substances or principles have been discovered as existing in the mydriatic plants; but it is now generally conceded, especially through the researches of Ladenburg, that these consist of three distinct isomeric bodies, having in common the formula  $C_{17}H_{23}NO_3$ , and named respectively *Atropine*, *Hyoscyamine* and *Hyoscine*, the last named being found only in *hyoscyamus niger*, associated with hyoscyamine. The substances formerly described as Daturine, from *Datura stramonium*, and Duboisine, from *Duboisia myoporoides*, are now considered to be identical with hyoscyamine.

Atropine, hyoscyamine and hyoscine are closely allied not only in their chemical composition, but also in their physiological effects and their general chemical properties, yielding much the same results with the ordinary reagents. According to Ladenburg, atropine fuses at  $114^{\circ}C$ , hyoscyamine at  $108^{\circ}C$ . In the free state, hyoscine forms a syrupy liquid, which, with acids, forms crystallizable salts. Other differences have been pointed out in regard to these principles, but these would rarely serve for discrimination in ordinary toxicological investigations.

In the following comparative examination of some of the tests for these substances, recent samples of the three alkaloids as prepared by Merck, Trommsdorff, and by Kahlbaum, were employed. Only one preparation, however, of hyoscine (Kahlbaum's) was examined, this being in the crystalline state, as hydrochloride.

(1) *Vitalis' Test*.—This test, as is well known, consists in treating the solid alkaloid or one of its salts with a drop or two of nitric acid, evaporating to dryness on a water-bath, and treating the cooled residue with a drop of a strong alcoholic solution of potassium hydroxide, when a deep violet coloration is produced.

On comparing the above samples of the three alkaloids, in equal but varying quantities, side by side, under this test, no appreciable difference was observed in the results. It has been stated by some writers that under this test atropine yields a yellow coloration, whereas hyoscyamine yields a purple color; but this difference did not exist in the preparations examined.

(2) *Auric Chloride*.—This reagent throws down from aqueous solutions of salts of the alkaloids, even when quite dilute, a bright yellow precipitate of the aurochloride of the alkaloid. The precipitate from *hyoscine*, being the least soluble of these gold salts, is notably greater in quantity, and it more promptly assumes the crystalline form than the precipitate from like solutions of either of the other two alkaloids.

If a drop of a 1-100th solution of the alkaloids be treated with a drop of the reagent, the *hyoscine* solution yields a very copious precipitate and soon the mixture becomes a solid, confused crystalline mass. The precipitate from atropine stands next in quantity, that from hyoscyamine being least. No marked difference was observed in the color of the precipitates, even on spontaneous evaporation to dryness.

A drop of a 1-1000th solution of the alkaloids gave with the reagent, very uniformly in the case of *hyoscine*, a precipitate which quickly formed crystalline lamina or leaves; whilst that from atropine formed minute granules, and that from hyoscyamine crystalline blocks or masses.

(3) *Bromine Test*.—As we have pointed out elsewhere, a solution of bromine in bromohydric acid throws down from solutions of atropine and of hyoscyamine, even when highly dilute, a yellow amorphous precipitate which is soon converted into characteristic crystals, no marked difference being observed between the reaction of the two alkaloids. With an aqueous solution of *hyoscine*, the reagent produces a voluminous yellow precipitate which soon becomes converted into minute globules; these change to large yellow drops, which slowly dissolve to a colorless solution. In no instance

were crystals obtained by the reagent from a 1-100th or more dilute solution of this alkaloid.

This reaction, therefore, serves to discriminate atropine and hyoscyamine from hyoscine, at least from the preparation under examination.

The Bromine reagent may be very satisfactorily applied to atropine and hyoscyamine, and their salts, in the *solid* state. If a minute portion of either alkaloid be touched with a small drop of the reagent, it is *immediately* converted into a mass of crystals, consisting of rough needles, twig-like masses and bright yellow plates.

The residue from one drop of a 1-1000th solution of the alkaloids yields with the reagent, a mass of crystals of the usual forms; and the residue from a drop of a 1-10000th solution, gives a very satisfactory deposit of crystalline needles and granules.

This reaction, as in the case of solutions of the alkaloid, will manifest itself in the presence of comparatively large proportions of foreign matter. Thus, if a drop of a 1-1000th solution of the alkaloid be treated with a drop of ordinary urine, and the mixture evaporated to dryness, the residue will yield, under the reagent, a very satisfactory crystalline reaction, although the proportion of urine solids to the alkaloid present is about 50 : 1. Crystals may be obtained from even a much less quantity of the alkaloid mixed with this amount of urine solids.

If the Bromine reagent be applied to a minute drop of a syrupy solution of *hyoscine*, it is immediately converted into a mass of reddish-yellow globules, which soon change to bold groups of faintly yellow crystals, these being quite different in form from the crystals obtained from the other two alkaloids.

The *residue* from a drop of a 1-100th solution of hyoscine yields, under the reagent, a mass of yellow globules, which soon become converted into groups of bold crystals. From the residue from a 1-1000th solution of this alkaloid no crystals were obtained, the precipitate consisting alone of oily drops.

(4) *Picric Acid*.—A drop of a 1-100th solution of *atropine*, when treated with a drop of an alcoholic solution of this reagent, yields a voluminous yellow precipitate, which slowly becomes converted into minute yellow drops. If, however, the mixture be stirred with a glass rod, it quickly yields beautiful groups of yellow crystals, as figured in *Micro-Chemistry of Poisons*. Pl. xiii, Fig. 1.

A drop of a similar solution of *hyoscyamine* yields, with the reagent, results not to be distinguished from those from *atropine*.

A like solution of *hyoscine* gives, with the reagent, a yellow precipitate, which remains amorphous; but on stirring the mixture it slowly becomes, on standing, a dense mass of fine, feathery or plumose crystals, markedly different in form from the crystals of the preceding alkaloids. These crystals are less readily formed than those from either *atropine* or *hyoscyamine*.

(5) *Platinic Chloride*.—Under the action of this reagent, when applied to somewhat strong solutions, no marked difference was observed between the three alkaloids.

UNIVERSITY OF PENNSYLVANIA.

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## STRUCTURE OF GERANIUM MACULATUM.

BY EDSON S. BASTIN.

This plant is popularly known as *Cranesbill*, and is common in open woods and fields, especially in clayey soil, throughout the northern United States as far west as the States bordering on the Mississippi River, and as far south as Tennessee, but it is rare in the Gulf States, and does not occur in the Rocky Mountain and Pacific Coast floras.

The plant is an erect perennial herb, with slender, forking, hairy stems which attain a height of from ten to eighteen inches. The leaves are of two kinds, radical and cauline, the former, long petioled, often rising to the height of eight or ten inches from the ground; the latter are much shorter petioled, the upper even almost sessile, and inserted opposite each other on the stem; both kinds are stipulate, and in both the orbicular, deeply cordate lamina is parted into five cuneate divisions, each of which is lobed and cut at the apex. The leaves are also hairy, and when old become blotched with light green, which fact has given origin to the specific name of the plant. The stipules are lanceolate and pointed. The flowers are arranged in umbel-like, few-flowered cymes, and each peduncle bears from one to three flowers. The flowers are pentamerous, regular, symmetrical and hypogynous. The calyx is persistent and chorisepalous; the sepals imbricate in the bud, lanceolate, cuspidate and villous. The rather fugitive choripetalous corolla is light purple and the petals are broad, about one-half inch long, clawed, and the claw is

bearded. The stamens are ten in number, in two whorls, the outer whorl sometimes sterile, but, when perfect, ripening and shedding their pollen before the inner one, and the latter shedding their pollen before the stigmas have unfolded, so that the flowers are protandrous. The filaments are broadened at the base and somewhat

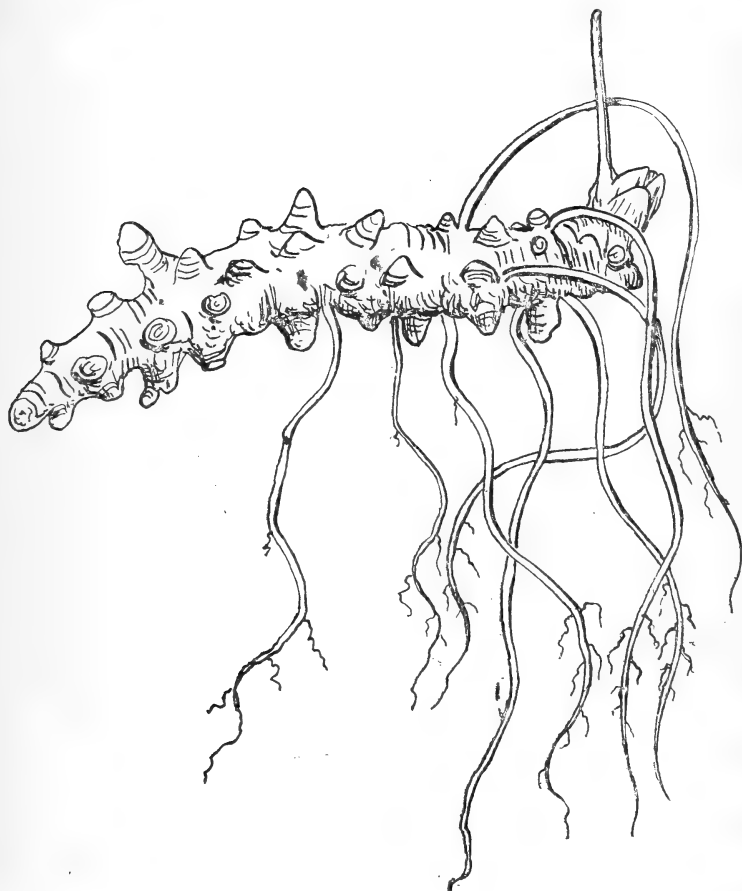


FIG. I.

united; the anthers are two-lobed and longitudinally dehiscent. The pistil has its five carpels united about a lengthened receptacle, which, along with the adherent portion of the styles, develops in fruit into a long beak. The ovary is deeply five-lobed and five-celled and each cell contains a single seed. Each carpel separates elastically, beginning at the base, from the elongated, persistent receptacle. The

minutely reticulate seeds are exalbuminous, and the cotyledons are plicate and incumbent.

The rhizome, the part employed in medicine, is from two to four inches long, one-fourth to three-fifths of an inch thick, often

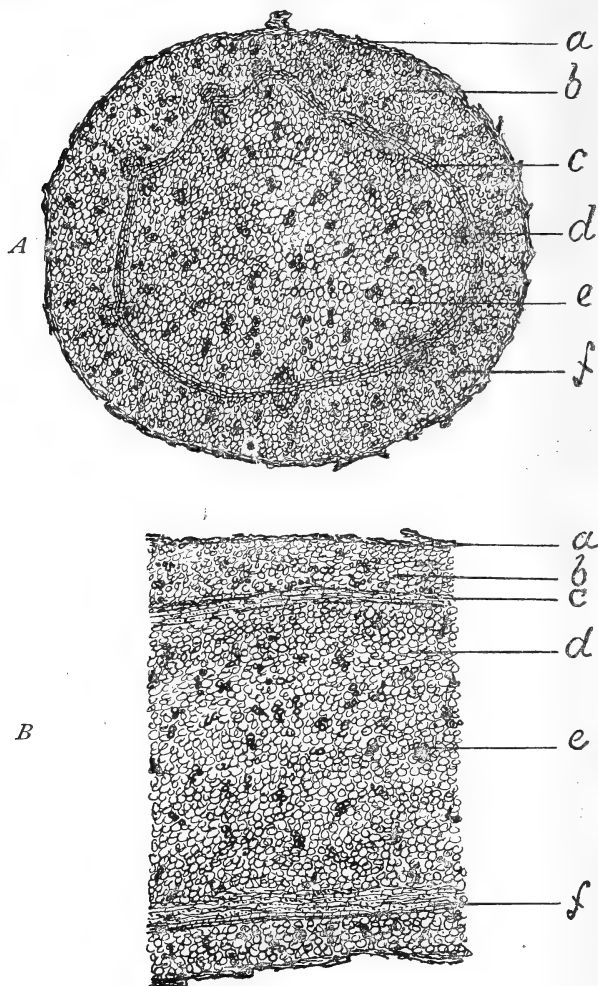


FIG. 2.

branched, bent and strongly tuberculate, dark purplish-brown exteriorly and light purplish-brown interiorly. When dried it is wrinkled longitudinally, and breaks with a short, non-fibrous fracture. The nearly simple roots attain a diameter of about one-twenty-fifth of

an inch at their base, and may spring from any part of the surface of the rhizome, but more abundantly from the sides and lower surface. They may attain a length of five inches, but average somewhat shorter. When dry they are brittle, and in commercial specimens of the drug only the bases of the roots are found present on the rhizome. Both the rhizome and roots are without odor, and possess a purely astringent taste.

A transverse section of the rhizome shows a large pith, a distinct cambium zone, which is seldom circular, approaches much nearer

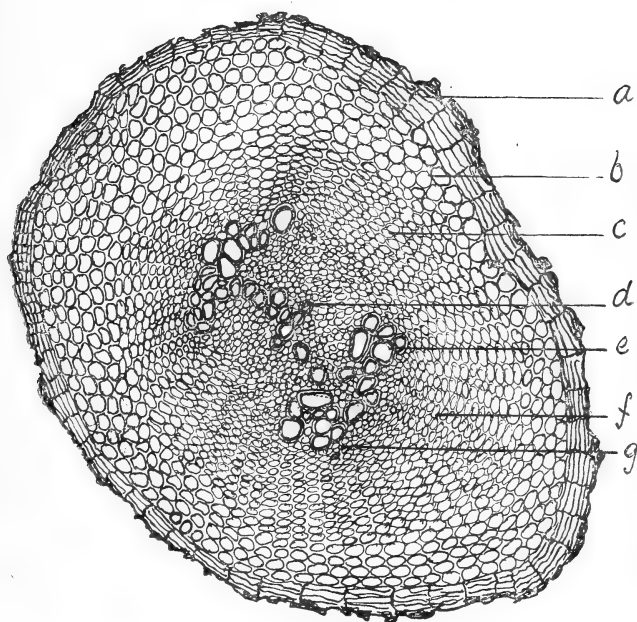


FIG. 3.

the surface at some points than at others, and connects a few vascular bundles that are usually situated at very unequal distances apart. The phloroglucin test shows no lignified tissues except in the xylem of these bundles, and here only the vasiform tissues are stained, no wood-cells being developed. The inner layer of the bark shows no evident radial structure. The outer bark is composed of a thin layer of cork made up of cells considerably elongated in a tangential direction. The exterior of this layer is rough and irregular by reason of the scaling away of the outside tiers of cells.

If the rhizomes are gathered in the autumn of the year, when the vegetative growth of the season has been completed, the parenchymatous tissues will be found heavily charged with starch. If gathered in spring, when vegetation is well advanced, however, the starch may have wholly disappeared, having been employed in the development of the leaves and above-ground stems.

If sections be treated under proper conditions with a solution of ferric chloride, or with a solution of ammonio-ferric alum, the

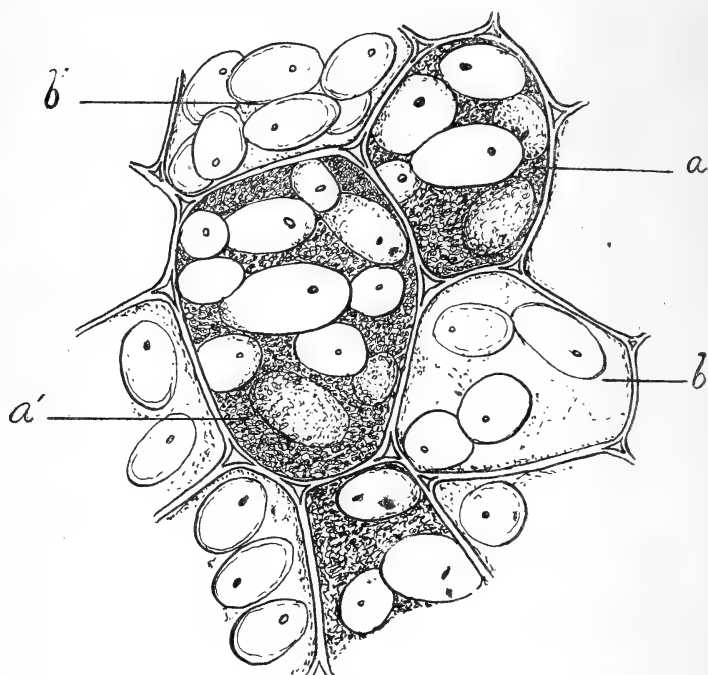


FIG. 4.

copious blue black precipitate produced, due to the presence of tannin, will be found to be much more abundant in some cells than in others, though there are few cells wholly destitute of it. Those in which the precipitate is most copious seem indeed to be chiefly devoted to the secretion of tannin, and they may appropriately be called tannin cells. Besides tannin, however, they usually contain some starch and proteid matter. They commonly occur in clusters of two or more, and these clusters are scattered irregularly through the parenchymatous tissues of the pith and bark. If the section be



cleared by treatment with strong carbolic acid solution, which renders the starch grains transparent, the tannin cells may easily be distinguished from the ordinary parenchyma cells by the abundance of their finely granular contents. The tannin seems to be deposited both in the interior of the cell and in the cell wall.

The xylem portion of the vascular bundles is made up chiefly of small-sized scalariform tracheids and parenchymatous elements.



FIG. 5.

A cross-section of a root usually shows a diarch radial bundle, and although the root early undergoes secondary changes, the diarch character of the bundle remains easily recognizable, and the structure appears quite characteristic. This is shown by an inspection of the drawing, *Fig. 3*, in which *d* represents one of the primary xylem rays, *c* one of the primary phloem masses, and *e* and *f*

portions respectively of the secondary xylem and of the secondary phloem.

It would be interesting to determine by the study of specimens gathered at different seasons of the year whether any relation exists between the amount of starch and the amount of tannin in the rhizomes. Does the amount of tannin in the rhizome increase as the starch diminishes, or is the amount of starch totally independent of that of tannin?

The starch of geranium is rather characteristic. The grains are smooth, mostly long, ovate in outline, with the hilum located near the larger end. The hilum is occasionally fissured, but is usually unfissured. The grains are very seldom double, but sometimes binucleated. About the hilum are a series of curves, those nearest it circular and concentric with it, while those farther away are more elliptical and eccentric, and the more eccentric the more remote they are from the hilum. The longest grains are about the  $\frac{1}{700}$ th of an inch in length. The polarization cross is very unequal-armed, as shown in *a*, *Fig. 5*.

#### DESCRIPTION OF FIGURES.

*Fig. 1.*—Rhizome and roots of *Geranium maculatum*, *L.*, natural size.

*Fig. 2.*—Sections of a rhizome magnified twelve diameters.

*A.* Transverse section; *a*, corky layer; *b*, middle layer of bark; *c*, cambium zone; *d*, vascular bundle; *e*, pith; *f*, cluster of tannin cells.

*B.* Longitudinal section; *a*, corky layer; *b*, middle layer of bark; *c*, cambium zone; *d*, pith; *e*, cluster of tannin cells; *f*, vascular bundle. The sections from which drawings were made had been cleared of starch.

*Fig. 3.*—Cross-section of root magnified 75 diameters; *a*, corky layer; *b*, primary cortex; *c*, primary phloem; *d*, primary xylem ray; *e*, secondary xylem; *f*, secondary phloem; *g*, cambium.

*Fig. 4.*—A few tannin and ordinary parenchyma cells from pith of rhizome magnified 375 diameters. *a* and *a'* tannin cells, also containing starch grains; *b* and *b'* ordinary parenchyma cells.

*Fig. 5.*—Starch of *Geranium* magnified 750 diameters. *a*, one of the grains as viewed by aid of polarized light.

## A NEW DIAPHRAGM.

BY HANS M. WILDER.

When we wish to study an object by the microscope, we can make use of four kinds of illumination: (1) Ordinary day-light or lamp-light. (2) The same intensified by a condenser. (3) Dark-ground illumination. (4) Polarized light.

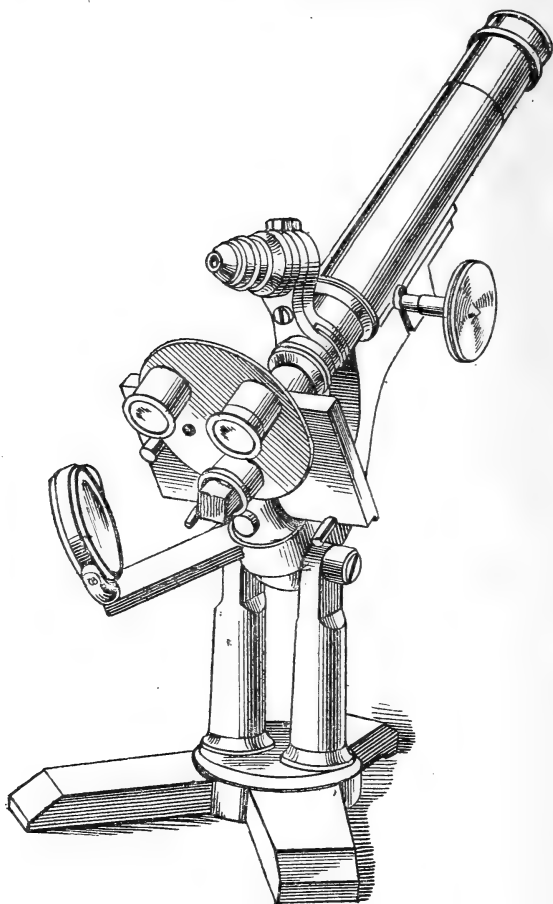
Hitherto, in changing from one illumination to another, it has been necessary to consume not a little time in exchanging (respectively, inserting) the different lenses required, and, after using them, to go through the same process in inverse order. This is tedious and time-consuming, not to mention that one is apt to forget what he noticed, especially with the other kinds of illumination.

My diaphragm obviates all this trouble, and makes any necessary change as easy as winking the eye. Instead of unscrewing and again screwing on the various lenses, a mere quarter of a revolution of the wheel of the diaphragm effects the change. For polarization an additional, but quickly-made motion becomes necessary. The ordinary analyzer is replaced by a tourmalin, which, suitably mounted, is slipped over the eye-piece and revolved. It has the additional advantage, that whilst the nicol very much restricts and circumscribes the field of view, the tourmalin gives an unobstructed field. The modification of the colors by that of the tourmalin is hardly noticeable.

The diaphragm is the usual disk (or wheel) pierced with three large holes and one smaller one. The last is for ordinary light. Into each of the three larger holes is fitted a short "sleeve," into which again fits, a little tightly, a short cylinder. In one cylinder is fitted a hemispherical lens, serving as condenser; into the second is fitted a similar lens, having on its plane side a small disk of black paint, the size of which has to be arrived at experimentally, so as to give a good black field (the light coming around the circumference gives dark-ground illumination); in the third is fitted a nicol (polarizer); a hemispherical lens on top of the nicol will increase the brightness of the colors.

I use "hemispherical" lenses in preference to the usual "plano-convex," because the focus of the former is much shorter. The condenser may be made to give a perfectly blinding light, suitable for the most difficult bacteria, and, by gradually withdrawing the tube, the light can be softened down to almost any extent, using in

addition a judicious handling of the mirror. It has been pointed out that an "Iris" diaphragm should be attached to it. True! But then we cannot have everything. There is, however, nothing to hinder anybody from adding an additional sleeve suitable to take the "Iris," replacing the small hole, but it is hardly necessary.



This diaphragm is a handy one, aside from the convenience, saving an outlay of \$15 to \$25, if the ordinary accessories had to be used; the details may be improved, however.

It can be added to any microscope, and it is not absolutely necessary to get an optician; any pattern-maker can make the brass parts.

It is not patented.

## OINTMENT OF MERCURIC NITRATE.

BY CHARLES H. LAWALL, PH.G.

Unguentum Hydrargyri Nitratis, or Citrine Ointment, as it is commonly called, is one of the most difficult preparations of the Pharmacopœia to make, and at the same time obtain uniform results. This is not due to lack of research and experiment, for scarcely a preparation of the Pharmacopœia confronts us with such an array of literature regarding its preparation and ingredients, as this one. Considering this fact, as well as the age of the compound, which dates from the seventeenth century, it is surprising to note how many otherwise skilful pharmacists attain very unsatisfactory results in making this ointment.

It is not the purpose of this article to give an historical account of Citrine Ointment, as that has been ably done in several previous articles.<sup>1</sup> However, it would not be amiss to mention some of the fats suggested at various times as a substitute for the lard oil of the present official preparation.

Neatsfoot Oil,<sup>2</sup> Lard,<sup>3</sup> Butter,<sup>4</sup> Peanut Oil<sup>5</sup>, Almond Oil<sup>6</sup>, Castor Oil,<sup>6</sup> Palm Oil,<sup>6</sup> Bear's Oil,<sup>7</sup> Ox Marrow,<sup>8</sup> Beef Suet,<sup>9</sup> Stearic Acid,<sup>10</sup> Petrolatum,<sup>11</sup> and almost all of the other fats from the animal and the vegetable kingdoms, and even one from the mineral kingdom, appear to have been experimented with in the vain hope of finding some fat or oil which would make a good and durable ointment.

Several writers have taken another course and have tried to preserve the products obtained from former processes. One advises keeping the ointment in a jar and covering it with a layer of glycerin to prevent oxidation<sup>12</sup>; others have tried the addition of cam-

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<sup>1</sup>AM. JOUR. PHAR., 54, p. 618; 41, p. 211.

<sup>2</sup>Ibid. 1, p. 171, 3, p. 85.

<sup>3</sup>Ibid. 13, p. 101.

<sup>4</sup>Ibid. 14, p. 110; 30, p. 102; 54, p. 586.

<sup>5</sup>Ibid. 30, p. 102; 45, p. 460.

<sup>6</sup>Ibid. 30, p. 102.

<sup>7</sup>Ibid. 32, p. 212.

<sup>8</sup>Ibid. 49, p. 551.

<sup>9</sup>Ibid. 51, p. 438.

<sup>10</sup>Ibid. 51, p. 438; 58, p. 8.

<sup>11</sup>Ibid. 58, p. 8.

<sup>12</sup>Ibid. 52, p. 300.

phor<sup>1</sup>; still others have given their attention to the mercurial portion of the ointment, and suggest making the nitrate from the oxide of mercury instead of making it from the metal.<sup>2</sup> Some have even been skeptical as to the reliability of any process<sup>3</sup>, but those who have approximated the truth more nearly are they who advise careful manipulation, especially as regards temperature.<sup>4</sup>

In regard to the selection of Lard Oil as the official base for the ointment, experiments have proven<sup>5</sup> that it is superior to all other oils suggested, consequently the fault does not lie there. The chief difficulty appears to lie in disregarding the temperatures to be observed during the operation.

It is to be regretted that so many good pharmacists neglect the use of a thermometer in the manufacture of those preparations of the Pharmacopœia which require the use of this valuable instrument.

The temperatures which are advised in the working formulæ of many of the official preparations have been found by actual experience to give the most satisfactory results in practice, yet many pharmacists neglect this important feature, and then complain about the formulæ in the U. S. P.

However, in the case of Citrine Ointment, the official process does not give uniform results even with careful manipulation. The reactions appear to be satisfactory, but the finished preparation is generally found to be spongy or granular. This is especially the case when working with large quantities, and constitutes a very serious annoyance.

While experimenting to overcome this difficulty a process was found which gives excellent results with either large or small quantities, and it has been used for some time with satisfactory results. The official ingredients and quantities are used, and the following instructions regarding temperatures must be carefully adhered to

First, heat the lard oil to 100° C., as in the official process, remove heat, add the nitric acid without stirring, and reapply heat when effervescence ceases, till all gas is expelled. It is best to use a vessel of

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<sup>1</sup>AM. JOUR. PHAR. 14, p. 110; 54, pp. 145-232.

<sup>2</sup>Ibid. 58, p. 8; 34, p. 394.

<sup>3</sup>Ibid. 37, p. 296.

<sup>4</sup>Ibid. 4, p. 197; 14, p. 61; 22, p. 119; 32, p. 272; 41, p. 211.

<sup>5</sup>Ibid. 55, p. 438.

six times the capacity of the quantity to be made to allow for the copious effervescence which takes place. When the foregoing mixture has cooled to 40° C., the solution of mercuric nitrate is added and the temperature is raised gradually to 60° C., and maintained until no further evolution of gas is noticed. If it is then agitated until cold, as usual, the resulting product will comply with the requirements of the Pharmacopœia.

Ointment made by the U. S. P. method, which has become spongy, may be remedied by elevating the temperature to 60° C. and cooling with agitation.

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## NITRO-GLYCERIN IN THE PHARMACOPŒIA.

BY J. B. NAGELVOORT.

A dozen good pharmaceutical journals do not mention the fact that nitro-glycerin can be washed out of its alcoholic solution, and that a fairly accurate and practical quantitative estimation of nitro-glycerin in alcoholic solutions can be based upon this property. The following simple method does not seem to have deserved a place in the hand-books on pharmaceutical chemistry, either.

When it is taken into consideration that it is better to have a quantitative estimation of some kind than none at all, in the case of such a powerful medicine as nitro-glycerin, it might appropriately be published how I ascertain, in perfect safety for the manufacturer and myself, the percentage strength of the Pharmacopœial

### SPIRIT OF NITRO-GLYCERIN.

When I remember that it must be about ten years since solutions of nitro-glycerin were introduced into pharmacy, this lack of information on this subject is astonishing, notwithstanding the fact that the Pharmacopœia has no better offer to warrant the dispenser that he furnishes a 1 per cent. solution of nitro-glycerin, than a clear, colorless liquid, specific gravity, etc.

As a starting-point, can safely be assumed the purchase of a 10 per cent. alcoholic solution of nitro-glycerin from one of the manufacturers of dynamite or giant powder. I advise even to buy such a solution and dilute it to its required strength.

When such a purchase is made in the winter, one has to know very well what he is about. A few years since, when a workingman

brought me a gallon bottle, filled with an alcoholic solution of nitro-glycerin, in which laid at least 500 cubic centimetres of undissolved nitro-glycerin on the bottom, I escaped annihilation by a hair's breadth. With a question, "I would like to know what that oil is?" he gave the bottle a smart rap on my table, and pointed to the nitro-glycerin that had settled in the cold weather.

Cool a quantity of such a 10 per cent. alcoholic solution of nitro-glycerin to 15° C. Take 50 cubic centimetres of it; pour this quantity into 2 litres of water; agitate the mixture and set it aside in a cool place over night. (In cold weather, take care that the water cannot freeze and break the bottle so as to endanger your life.)

The next morning, siphon off the water, only leaving enough in the bottle to transfer the nitro-glycerin—which has separated and lies as a syrupy fluid on the bottom—into a 50 cubic centimetre graduate which is graduated into  $\frac{1}{2}$  cubic centimetres. Use a funnel; this insures against loss; let the funnel drain.

If the 10 per cent. alcoholic solution of nitro-glycerin is of the required strength, there should be about 2.5 cubic centimetres of nitro-glycerin in the graduate. I seldom have reason to complain about the strength of solutions sold as 10 per cent.

Since we measure, instead of weigh, our nitro-glycerin, its volume has to be multiplied by its specific gravity, which is 1.60, in order to obtain its weight.  $2, 5 \times 1.6 = 4$ .

Applying a correction for the solubility of nitro-glycerin in a large quantity of water (Allen says, "Commercial Organic Analysis," Vol. II, p. 305, it is 1 gram in 800 cubic centimetres), it is a simple calculation to verify the fluid under examination.

Dilute according to the figures found, to pharmacopœial strength. This is more satisfactory than to believe a statement on a label.

Perhaps it is not superfluous to advise one to pour the nitro-glycerin which has separated, into a well, creek or river, if he does not intend to dissolve it for future use.

DETROIT, October 3, 1894.



## FACTS IN BRIEF FROM THE LIFE OF MICHAEL FARADAY.

Compiled from "Thorpe's Sketches in Historical Chemistry."

Written for the AMERICAN JOURNAL OF PHARMACY.

BY WILLIAM B. THOMPSON.

Born in England, 1791. Poor, with limited schooling. Errand boy at twelve, to bookseller. Love of books led to pursuit of knowledge. Watts on the Mind, and Mrs. Marcet's conversation on chemistry, inculcated the habit of reflection and observation, and aroused love for science. Frequently went, during boyhood, to hear Sir Humphrey Davy lecture at the Royal Institution. Finally, became, ere he reached twenty years, laboratory assistant and amanuensis to Davy. He took copious notes of Davy's lectures, amplified them and illustrated them with rude sketches or drawings of apparatus. Travelled on the Continent and through Italy with Davy and his spouse, acting, partly, in the capacity of valet, much to Faraday's disgust. Expresses his preference for the pursuit of science to that of the occupations of trade as follows: "To escape from trade because of its viciousness and selfishness, and to enter the service of science in order to cultivate the amiability and liberality of feeling which pertains to its votaries." During the first decade of the present century and during Faraday's pupilage, Davy discovered the metallic state of potassium and determined the elementary character of iodine. (One Courtois, a manufacturer of saltpetre at Paris, is credited with the discovery of iodine in 1812.) Faraday delivered his first lecture January 17, 1816, to the City Philosophical Society, on "The General Properties of Matter." With Faraday lecturing was an art to be acquired. He was original in thought and copious in illustration. He carefully and systematically studied the art of lecturing in a manner to secure attention and impart knowledge. In order to cultivate grace of manner and give greater force and expression to his teaching, he took private lessons in elocution. He possessed the faculty of interesting the young and evinced a remarkable talent in his ability to convey information, especially to the youthful mind. Faraday received no less than ninety-five honorary titles and marks of merit from the various learned societies existent in Europe and America. In 1829 he became connected with his government in a scientific capacity. He was called upon to investigate causes of mine explosion. To devise ventilation for

lighthouses. The adaptability of lightning conductors. Analyzing and supervising means to protect drinking waters. In 1816 Faraday made his first contribution to literature in an analysis of *native* caustic lime. Between 1816 and 1820 he contributed thirty-seven notices and papers to the *Quarterly Journal of Science*. In 1823 he liquefied chlorine. In 1836 he discovered *benzene* (which he termed bicarburet of hydrogen) among the products of condensed oil gas. In this he may have laid the foundation of the discovery of the so-called aniline dyes, enormous quantities of benzene being used in the production of these beautiful colors. In 1831 was published the first series of his experimental researches in electricity—including magneto-electricity, voltaic induction and definite electro-chemical decomposition. His opinion of the value and usefulness of study is summed up in his own words, as follows: "I do think that the study of natural science is so glorious a school for the mind that, with the laws impressed on all created things by the Creator, and the wonderful unity and stability of matter, there cannot be a better school for the education of the mind." When nearly seventy years of age the Queen offered him, in consideration of his eminent service and distinguished ability, a house and home on Hampton Court Green, where the decline of his life was passed in that serene quietude so grateful to the mind in state of contemplation. Seated in his chair he passed peacefully from earthly life in August, 1867. Assuredly, the mind of Faraday was of noble cast. Yet he started career with but meagre aids to its development. But, herein lies the useful lesson afforded by the history of his life.

SEPTEMBER 29, 1894.

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## THE MATERIA MEDICA OF CEYLON.\*

BY HENRY KRAEMER.

A year ago, if one took the time and pains, he could not but be impressed, indeed, with the exhibits of *Materia Medica* by the Oriental and European nations at the World's Columbian Exposition. There were pounds of the important alkaloids of Cinchona, Opium, Coca, etc., small quantities, but sufficient to demonstrate the

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\* Read at the North Carolina Pharm. Assoc. Meeting, Sept., 1894.

rarer alkaloidal combinations and derivatives, and probably all of the newer synthetic medicinal products. The newer anæsthetics and hypnotics, with the host of the other newer remedies, were arranged in striking contrast with the oldest known forms of medicaments. Chief among the oriental nations in displaying her products was Ceylon. In an economic sense her exhibit was remarkable to the student. They exhibited tea and coffee from more than 100 estates, one sample of tea being valued at \$175 per pound. Her "Courts" were constructed entirely of native woods. Some 20,000 cubic feet of timber from twenty-two different trees were expressly felled and hewn for this purpose. Indeed, every product of the soil that could be utilized in manufacture, art, medicine or food was in the main displayed. The object of this paper is to record some of the facts regarding the practice of medicine in the Sinhalese and the commoner products employed, the information relating thereto having been in the main obtained as a result of the celebrated exposition.

One of their writers says: "In Sinhalese medical practice, disease is held to be a disturbance in the equilibrium of the three humors—air, bile and phlegm—which pervade the human system. These agents preside over certain vital functions, and while susceptible of being affected by temperature, diet, drugs, habits, etc., react on the organ whose functions they control. Every individual is supposed to be born with a predisposition to some one of these humors, or to a modification of one of them in combination with some proximate principle, corresponding with the nervous, bilious, phlegmatic and sanguineous temperaments formerly recognized in the practice of the medicines of Europe. The object of treatment, is therefore, to ascertain the mutual relation existing between these three humors in the patient and to bring about an equilibrium between them. Crude as this theory may appear, it is essentially the system which, borrowed from India by the Greeks and Arabians, entered more or less into all European systems of medicines till the close of the seventeenth century.

"Of the five or six hundred different causes of disease recognized in Sinhalese medicine, more than a fourth are ascribed to the abnormal conditions of the three humors, and the remainder to vitiation of the seven proximate principles of the human body, viz.: blood, flesh, fat, etc. Hence diseases are not classified by their symptoms so much as by their causes, and accidental symptoms are

not only confounded with essential ones, but receive special treatment as distinct diseases. The treatment accordingly is more theoretical than empirical, every symptom being referred to some deranged humor, which alone receives attention, and has to be rectified according to the rules laid down by recognized authorities. The true significance of any group of symptoms as indicating any definite morbid condition or any particular stage of disease, is barely, if at all, realized by the native practitioner, their only value being to assist the memory to recall the particular Sanskrit stanza which details the orthodox treatment to be adopted under the circumstances. No attempt is made to anticipate or arrest morbid changes or guide them to a healthy issue, except in so far as this is included in the general line of treatment, for the simple reason that a pathology based on actual observation of the dead body finds no place in the native text-books of medicine, and no native practitioner, however experienced, would care to verify by a post-mortem examination the fanciful theories on which their system of medicine is founded. A very common practice with native practitioners is to allow a disease to progress for some time with a view to 'mature' it or 'to bring it to a head' before any attempt is made to remove it. A quick recovery, whether under European or native treatment, is deprecated as likely to lead to a relapse, since sufficient time has not been allowed for the restoration of a permanent healthy equilibrium between the contending humors.

"They have great faith in critical days, and in the influence of the different phases of the moon, each of which is suffered to preside over its own set of organs, so that purgatives, for instance, however much they may be needed in any given case, are never prescribed on the day (kala) on which the moon exercises its influence on the bowels, nor emetics on the day on which it presides over the stomach, etc. As they seldom make use of powerful or hurtful remedies, however, and are content in the majority of cases to relieve disease chiefly by acting on the emunctories by means of emetics, purgatives and low diet, native practice is usually not often mischievous even when it fails to effect a cure. In most cases the treatment only serves to change an acute disease into one of a chronic character, while recovery from a simple affection is protracted, the patient being kept half-starved on gruel and made to swallow large quantities of infusions and decoctions of medicinal herbs, the number of

ingredients in each potion increasing in direct ratio with the continuance and severity of the disease. A mild form of fever would be treated with a decoction of the 'Five Minor Roots:' *Desmodium gangeticum*, *Uraria lagopodioides*, *Solanum Jacquini*, *S. indicum* and *Tribulus terrestris*, which are believed to cure fever due to deranged phlegm, catarrh, etc. A severer form would be ascribed perhaps to deranged air, requiring the use of the 'Five Major Plants:' *Ægle marmelos*, *Calosanthus indica*, *Gmelina arborea*, *Stereospermum suaveolens* and *Premna speciosa*. In remittent fever, etc., all ten may be prescribed together, and in typhoid fever, with head symptoms, the same with the addition of eight or ten other ingredients."

When conducted by intelligent and skillful practitioners, native practice, it is said, is not unlike the modern treatment of medicine in Europe. Unfortunately, however, the practice of native medicine has fallen into the hands of men, many of whom do not possess even the little knowledge which may be gathered from the medical books in the vernacular. The following list of vegetable drugs is selected as being used by the native practitioners, and is derived from plants indigenous to Ceylon. The uses given under each one have been taken down at first hand from the mouths of the *vedaralas*, or village doctors, themselves. It must not, however, be supposed that they are in all or even in a majority of cases, based on any real properties. Much is considered to be traditional merely, or empiric and in much the same manner as up to the seventeenth century in Europe, numerous plants which are now considered quite inert, were credited with virtues on the authority of older writers and astrologers. The extreme complexity of Sinhalese prescriptions (many of which are of great antiquity and handed down from generation to generation,) must often render it impossible to distinguish the effects of any particular ingredient:

*Abrus precatorius*, Linné (Olin-da-wel). N. O. Leguminosæ. The seeds of this plant have been used for many years by the inhabitants of the West Indies, for the making of various articles of decoration. Some time ago it attracted considerable attention as "the weather plant," or vegetable barometer, and later it was said to be used habitually by the "chamars," or native hide-traders in the neighborhood of Calcutta, as a cattle poison. In this latter use the seeds, kneaded into a paste, were smeared on tiny pegs of bamboo, and with these they pierced the cows' hides. The *kooch* poison, when taken internally, has, however, been found to be uninjurious, and another extraordinary fact said to be discovered is that a cow treated inwardly with certain preparations of the *kooch* poison becomes proof against being poisoned by subsequent pin

punctures. Should this prove to be so, there is reason to believe that the opinions of Cornil and Berlioz, who declare that the "bacteria of jequirity are its only active principles," are not wholly contradicted. *Abrus precatorius* is a copiously branched climber, with slender branches. Leaflets are small and possess a sweet licorice-like taste. Racemes many flowered, corolla reddish or white. Pod one to one and one-half inches long. Seeds bright scarlet to black, or black, or whitish, or mixed black and white. In Ceylon the juice of the green leaves is used for purification of the blood, especially in females. The root for sore throat, leprosy, stiffness in joints, paralysis and nervous diseases. Externally it is applied to ulcers and sores.

*Acacia intsia* (see *Mimosa intsia*).

*Adenanthera pavonina*, Linné (Madatiya). N. O. Leguminosæ. An erect tree without spines or tendrils; leaves ample, bipinnate, pinnæ short stalked; flowers minute in narrow spike-like racemes; pod strap-shaped, six to nine inches long, falcate, ten to twelve seeded; seeds bright colored. The leaves and the bark in combination with other medicines are used to reduce the swellings of sprains and bruises. In case of snake-bite by the polonga, if the wounded part is stroked with a bundle of leaves several hundred times, it is believed that the poison will be expelled.

*Adhatoda vasica*, Nees (Adhatoda). N. O. Acanthaceæ. A dense shrub, sometimes arborescent; leaves elliptical, acute at both ends, entire, minutely pubescent; spike dense, short, corolla white; capsule, clavate, pubescent, four seeded; seeds, glabrous tubercular-verrucose. It is frequently cultivated. The root, leaves, flowers and bark are used in diseases caused by excessive phlegm, also in menorrhagia and in rheumatism.

*Egle marmelos*, Correa (Beli). N. O. Rutaceæ. The "Bael" is a small deciduous tree with straight, strong axillary spines one inch long. Leaflets three to five, ovate lanceolate, lateral sessile, terminal long-petioled. Flowers, greenish-white, sweet scented. Fruit two to five inches in diameter, globose, oblong or pyriform, rind gray or yellow, pulp sweet, thick orange-colored. The root, bark and leaves are employed for flatulency and in low fevers attended with biliousness and diarrhoea. The unripe fruit boiled and then baked under hot ashes checks diarrhoea and dysentery. The ripe fruit is cooling and laxative, and a good remedy for piles. A sweet scented extract from the flowers is used as a lotion for the eyes.

*Erura lanata* (Polkudupala). N. O. Amarantaceæ. Much employed for coughs; as a vermifuge for children and in indigestion.

*Aliesomeles ovata* (Yokwansa).—The leaves, bark and root are used in colic, catarrhal fever, cough and similar diseases.

*Alysicarpus bupleurifolius* D. C. (Aswenna). N. O. Leguminosæ. An annual or biennial; stems 1-2 feet ascending, glabrous; leaflets linear or lanceolate, 1-3 inches long, rounded at the base; flowers in racemes, calyx much longer than the first joint of the pod, its teeth imbricated in the fruiting stage. It is a mild astringent. The root is used in admixture with other medicines in mild fevers. The leaves are locally applied to wounds and bruises.

*Atalantia ceylonica*, Oliv. (Yakmaran). N. O. Rutaceæ. A bush or small tree, unarmed or armed with very straight spines  $\frac{1}{4}$ -1 inch long. Leaflets variable; flowers very shortly racemed. It is common in the warmer parts of

Ceylon and the leaves and roots are used in catarrhal fever, cough and similar troubles.

*Andropogon muricatus* (Sevendara) N. O. Gramineæ. The roots are used in bilious fever.

*Azadirachta indica*, Adr. Juss. (Kohomba) N. O. Meliaceæ. Now placed by Hooker (Flora Brit. India) in Melia and called Melia Azadirachta, Linné. It is a tree common throughout the greater part of India. In size it is 40-50 feet. Flowers, whitish, honey-scented. Leaves, 8-15 inches long, crowded near the ends of the branches. The seeds supply an oil (see Buchanan Journ. Madras 1, 9); a gum also exudes from the tree (Buchanan, l. c. 183). The wood resembles mahogany and the bark is very bitter. The juice of the leaves is used for injuries to the eyes and to kill intestinal worms. The bitter bark is employed in fevers and convulsive diseases. The fruit is vermifuge and purgative. The oil extracted from the seeds is a good external remedy for rheumatism caused by exposure to cold air.

*Barleria prionitis*, Linné. (Katukarandu). N. O. Acanthaceæ. A bush 2-5 feet high, usually very prickly. Leaves, entire; flowers, axillary; fruit, a capsule. Occurs in tropical India from the Himalayas to Ceylon and Malacca probably in most cases introduced as it is used for the preparing of hedges. It is said to be a cooling diuretic and tonic. The whole plant is used in urinary and paralytic affections, rheumatism, jaundice, hepatic obstruction and dropsy.

*Bassia longifolia*, Linné. (Mi.) N. O. Sapotaceæ. A common tree, 50 feet high; leaves clustered towards the ends of the branches, all of the young parts rusty tomentose. Leaves, lanceolate, narrowed at both ends, glabrous, distinctly nerved; stipules linear; pedicels 1-2 inches long, tomentose, in dense clusters near the ends of the branches. This tree yields a valuable timber and the flowers and fruit furnish a nourishing jelly. The bark is slightly astringent and rather pleasant. It is used as an appetizer and in rheumatism. The leaves and bark, as well as the fixed oil of the seed are used in rheumatic and cutaneous diseases. The oil from the seeds is the greenish *Elloopa oil* which is used externally.

*Bombax malabaricum* D. C. (Katu-imbul), N. O. Malvaceæ. A large tree covered with short, hard conical prickles, branches spreading; leaflets 6-12 inches long, glabrous, petiole longer than the leaflets, secondary petioles 1 inch. Flowers, numerous, fascicled at or near the ends of the branches; corolla, 6-7 inches, red or white. Capsule, 6-7 inches long, ovoid, downy, valves silky within. It is called *cotton tree* and grows through Eastern Himalaya and throughout the hotter forest regions of India to Burmah and Ceylon. The roots are employed as a restorative, astringent, and alterative; externally they are applied for swellings and rheumatic pains.

*Calotropis gigantea*, R. Br. (Wara). N. O. Asclepiadaceæ. A shrub with thick herbaceous branches, bark thick, soft, wrinkled, ash-colored. The young shoots, under-sides of the leaves and inflorescence are covered with soft woolly trichomes. Flower, purplish, lilac or white; flowering nearly throughout the year. One of the most common plants in dry waste places. The fibre from the inner bark was formerly used for the manufacture of cloth for the princes and nobles. The hairs of the seeds are said to be made into thread in Borneo. Attempts to weave it have been made in Madras. Gunpowder charcoal is made

from the young branches. The bark is described, with analysis made therefrom, in the Pharmacographia and the National Dispensatory. All parts of the plant are full of an acrid milk which possesses powerful medicinal properties. The green leaves are locally applied to dispel swellings. The root is a useful tonic, good in coughs and catarrhs. The milk of the plant is internally used as a cure for leprosy.

*Cardiospermum halicacabum*, Linné. (Penela-we) N. O. Sapindaceæ.—A climbing herb, branches slender, furrowed; leaves, deltoid or ovate, leaflets deeply cut; flowers, white and small; seeds officinal. The whole plant is used in cases of rheumatism, nervous diseases, orchitis and dropsy. It is used also as a hair-wash to remove scurf. The root is considered aperient.

*Cassia alata*, Linné. (Rata-tora) N. O. Leguminosæ.—A shrub with very thick but finely downy branches; leaves, subsessile, 1-2 feet long; leaflets oblong 16-28, rigidly subcoriaceous, rhachis narrowly winged on each side of the face; racemes, narrow, corolla, yellow distinctly veined; pod long, ligulate with a broad wing down the middle of each valve. The wood is used as an alterative.

*Cassia auriculata* (Ranawara) N. O. Leguminosæ.—A tall shrub with the virgate branches and underside of the leaves possessed of a fine gray down. Leaves nearly sessile, 3-4 inches long; leaflets obovate-oblong, rigidly subcoriaceous,  $\frac{3}{4}$ -1 inch long, obtuse or emarginate; furnished with glands on the main rhachis between the leaflets; stipules large and foliaceous. Flowers very large and showy, bright yellow in copious corymbose racemes. It is doubtful if the seeds are still used in the treatment of ophthalmia. The bark and roots are used as an alterative. The dried leaves in the form of a tea are likewise employed for the same purpose.

*Cassia fistula*, Linné. (Ehela). N. O. Leguminosæ.—A middle-sized tree, glabrous in all its parts. Leaves a foot or more long, leaflets 8-16, 2-6 inches long, ovate, distinctly stalked, usually acute, rigidly subcoriaceous, pale green, strongly veined. Racemes as long as the leaves. Pod well known in medicines. The tender leaves are employed in rheumatic fever as a mild purgative, and the bark in combination with other ingredients is used in rheumatism.

*Cellis cinnamomea*, Lindl. (Gurenda). N. O. Urticaceæ.—A tree with evergreen coriaceous leaves, obliquely ovate, acuminate, crenate-serrate, 3 nerved to below the tip, cymes short, flowers on short pedicels, drupes racemed, narrowed to the tip. The wood, which has a disgusting odor, is used in fumigation at child-birth. Internally it is taken in combination with other medicines in cases of cutaneous diseases.

*Cissampelos pareira*, Linné. (Diyamitta). N. O. Menispermaceæ.—A climbing shrub, with orbicular, reniform, or cordate leaves. It grows in tropical and sub-tropical India from Sindh and the Punjab to Ceylon and Singapore. The whole plant is said to cure ulcers. The roots are employed in fever and diarrhœa.

*Coscinum fenestratum*, Colebrooke (Weni-wel) N. O. Menispermaceæ.—A climbing shrub, young shoots, hoary-tomentose; leaves oblong, deltoid, glabrous above, hoary and reticulate beneath. Flowers green, heads umbelled. The woody stem is considered to be an excellent stomachic, and is a popular remedy in fevers. It also promotes appetite and is used in bloodshot eyes.

*Crateva Roxburghii*, now *C. religiosa*. var. *Roxburghii*. (Lunuwarana).



*N. O. Capparideæ*.—A tree with 3-foliate leaves, the latter small, ovate, lanceolate, abruptly acuminate, berry globose. The leaves are employed as a remedy for gouty swellings. The bark is used as an appetizer and in diseases of the urinary organs.

*Crotalaria laburnifolia*, Linné. (Yakberiya) *N. O. Leguminosæ*.—A low shrub with slender, elongated, terete branches; leaflets, ovate-oblong, acute, membranous, glabrous, 1-2 inches long, cuneate at the base. Racemes, terminal and lateral, corolla large, bright yellow, much exserted. Pod  $1\frac{1}{2}$ -2 inches long. The whole plant is employed for diseases of the gums and sore throat, and externally for sores and eruptions.

*Curcuma longa*, (Kaha) *N. O. Scitamineæ*.—This rhizome and its powder are well known. In Ceylon it is employed in skin diseases and also as a cooling wash in ophthalmia.

*Cyclea burmanni*, Miers. (Kehipittan) *N. O. Menispermaceæ*.—A climbing shrub with peltate leaves, latter thin, coriaceous; panicles equalling or exceeding the leaves, many flowered and pubescent. In Ceylon *Cyclea burmanni* ascends to 2,600 feet. The whole plant is used for catarrhal fever, cough and asthma.

*Cyperus rotundus*, Linné. (Kalandura), *N. O. Cyperaceæ*.—The rhizome is used in fever, diarrhœa, dyspepsia and stomachic complaints. It is also considered to be diaphoretic.

*Desmodium triflorum*, D. C. (Hin-undu-pinyali), *N. O. Leguminosæ*.—A trailing herb, stems cæspitose, very slender, trailing, copiously branched, clothed with fine, spreading hairs. Flowers 1-3, together without a common peduncle, in the axils of the leaves. Pod 3-5 jointed, pubescent. It is used in cases of fever caused by catarrh.

*Dipterocarpus zeylanicus*, Thwaites (Hora), *N. O. Dipterocarpeæ*.—A lofty tree, young branches compressed and glabrous, flowers in a raceme, petals blood red with pale yellow margins; fruit, a nut densely canescent. The resin is used in the devil ceremonies, and the leaves and bark to reduce the swelling of the joints of cattle caused by overwork. It will be remembered that a number of species of *Dipterocarpus*, indigenous to the East, yield *gurjun balsam*, or wood oil.

*Dregea voubilis*, Benth. (Kirianguna), *N. O. Asclepiadaceæ*.—A stout, tall climber, branches often pustular. Leaves ovate, sub-orbicular or cordate acuminate, rather coriaceous. Peduncles slender, umbels drooping, stigma dome-shaped. Follicles  $\frac{3}{4} \times 1\frac{1}{2}$  inches, broadly lanceolate, turgid, glabrous. Given in mild fever to children and also to women after child-birth to improve the secretion of milk. It is also said to cure asthma.

*Eclipta erecta*, Lamk. (Kikirindi), *N. O. Compositæ*.—This is now *E. alba*, Hassk. It is a strigose hirsute annual; leaves sessile, linear or oblong, lanceolate, narrowed at both ends. Heads small, axillary in terminal peduncles. Cosmopolitan in warmer climates. Like *Wedelia calandulacea* (Ran-wan-kikirindi), it is used to purify the blood, to cure cutaneous diseases and to cool the head.

*Eleusine indica*, Gært. (Walkurakan, Belatana), *N. O. Gramineæ*. This grass, naturalized from India and now so common, especially in Southern United States, known as "dog's-tail" or "wire-grass," is reputed in the Sinhalese *Materia Medica* to be useful in sprains and dislocations.

*Epaltes divaricata*, Cass. (Hinmudamahana) *N. O. Compositæ*. A glabrous

annual, 4-8 inches high, branched from the base; branches divaricate, winged; leaves, linear, lanceolate; heads in winged peduncles, when ripe dull purplish, with the involucral tracts almost pungent. It is a bitter and astringent tonic. It promotes digestion, cures bleeding piles and destroys intestinal worms. Also employed with benefit, it is said, in diseases of the urinary organs.

*Evolvulus alsinoides*, Wall. (Vesnu-kranti) N. O. Convolvulaceæ. This is now placed under *Breweria evolvuloides*, Choisy. A very much branched, rough, small shrub, with a few scattered strigose hairs. Leaves, oblong, small; flowers, small, axillary 1-3 together, whitish or pinkish; capsule sub-globular, 4 valved; seeds, glabrous. The whole plant is employed as a tonic and appetizer; it is a pleasant bitter and also used in mild cases of fever.

*Ficus altissima*, Blume (Nuga) N. O. Urticaceæ. A large spreading tree, with few aerial roots, young parts puberulous; leaves coriaceous, petioled, broadly ovate-elliptic, base rounded, never cordate, 3-5 nerved; receptacles sessile, axillary, in pairs, enveloped when young, early deciduous, calyptriform bracts ovoid, smooth, when ripe  $\frac{3}{4}$ -1 inch long; the 3 yellowish basal bracts, broad, yellow, obtuse, united at the base, pubescent or puberulous. It is used as a wash for ulcers and internally to check diarrhœa.

*Gmelina asiatica*, Linné. (Demata) N. O. Verbenaceæ. A shrub spinescent or unarmed; leaves entire or coarsely lobed, beneath glaucescent from a close coat of minute glands. Racemes terminal. The bark is employed in bilious fever and in indigestion attended with pains.

*Hedyotis avicularia*, Linné. (Geta-kola) N. O. Rubiaceæ. Herb, branched; leaves, usually pale green, when dry, 1-3 inches long; cymes, axillary, sessile, small, very dense flowered; calyx teeth variable. "Some Ceylon specimens have leaves with petiole  $\frac{1}{2}$  inch long and long caudate points as in Beddome's figure" (J. D. Hooker). Used for cooling the bowels and in cutaneous diseases.

*Hedyotis vestita* Br. (Pita-endu-pala) N. O. Rubiaceæ. A stout herb, 1-2 feet long, branches terete; leaves, 2-4 inches long, greenish when dry; cymes inconspicuous; fruit minute. It is used in nervous diseases and intermittent fever. Considered also to be a blood purifier.

*Hemidesmus indicus*, Br. (Iramusu) N. O. Asclepiadaceæ. It is a twining shrub, leaves opposite, hoary beneath and variable in form; corolla, green without, purple within; follicle, 4-5 inches. The root is used to purify the blood, promote appetite, cure skin diseases and syphilis. It is called native sarsaparilla. It was introduced into England, and the syrup like that of sarsaparilla is there used as a flavoring in medicine.

*Herpestris monniera*, H. B. & K. (Lunuivila) N. O. Scrophulariaceæ. A creeping herb, quite glabrous, rather succulent; branches, 4-10 inches long. The whole plant is a mild purgative; it is also used as a fomentation for erysipelas and elephantiasis.

*Hydrocotyle javanica* Thunb. (Maha-gotu-kola) N. O. Umbelliferae. A prostrate herb rooting at the nodes; fruit 1-10 inch, much compressed, obicular, lateral primary ridges commissural, intermediate, faint or none, pericarp, hard and thin. This plant is common in the mountains of Ceylon. This, like *H. asiatica* L. (Hin-gotu-kola) is said to be a good tonic, and is given to children chiefly for bowel complaints. It purifies the blood, checks slight dysentery and promotes digestion; it also cures nervousness and skin diseases, and

is a reputed cure for offensive breath. *H. asiatica*, it will be remembered, was the plant that was incorrectly reported about forty years ago as being efficacious in leprosy.

*Ipomœa beladambae* Roem. and Sch. (Bimtamburu). N. O. Convolvulacææ. An extensively trailing plant of Ceylon, abundant in damp fields. An oil obtained from this species is said to check giddiness and to keep the head cool.

*Ixora coccinea*, Linné. (Ratambala) N. O. Rubiaceæ. A branching shrub; leaves coriaceous, pale when dry, stipules with rigid cusps. Cymes rarely short peduncled; ramifications very short, articulate; bracts and bracteoles imbricate; flowers scarlet, sessile or very shortly petioled. Filaments long and anthers short for the genus. Stigma with short, revolute arms. "It is common in Ceylon, ascending to 2,000 feet" (Thwaites). The flowers and the bark are used for bloodshot eyes and the leaves for sores and ulcers. A tincture of the root of this plant, it will be remembered, was compared with ipecac as an antidyenteric.

*Kagia montana* (Welkahambiliya). This plant is employed in cases of mild fever in children caused by bowel complaints.

*Leucas zeylanica* Br. (Getakumba) N. O. Labiatæ. An erect annual, hispidly hairy or pubescent; leaves 2-3 inches long, shortly petioled, linear or elliptic or lanceolate, obtuse, subserrate whorls subterminal, many flowered. Common in Ceylon. Used in dog bite and in mild fever caused by indigestion; also to relieve pain caused by intestinal worms.

*Melia azadirachta* (see *Azadirachta indica*).

*Mimosa intsia*, Linné. (now *Acacia intsia* Willd.) (Eliddikumba.) N. O. Leguminosæ. A tree with minute hooked prickles, bractlets and leaf rhachises finely, downy or glabrous, the latter with a gland at the base between the 2-3 upper pinnæ; leaflets minutely cuspidate; peduncles finely downy, heads yellow; pod 4-6 inches long, straight, strap-shaped, glabrous, dehiscent. It is employed for cobra bite. A curious property that it is said to possess, is that if the plant be chewed when anything falls into the eye, it is believed that the foreign body will be removed.

*Oroxylum indicum*, Vent. (Totila) N. O. Bignoniaceæ—A glabrous tree with a thick bark; leaves opposite, large two or three times pinnate; leaflets ovate, entire, peduncle very thick; raceme ten inches; capsule 1-3 feet by 2-3¼ inches thick, margins somewhat incurved, valves woody. The bark is employed as a bitter tonic. It reduces rheumatic swellings, dispels phlegm, and checks diarrhoea, dysentery and fever.

*Tinospora cordifolia* Miers (Rasa-kinda) N. O. Menispermaceæ—A climbing shrub, bark corky, shoots glabrous; leaves cordate, glabrous; racemes exceeding the leaves; drupes size of cherry and red. The stem is employed in fever, skin diseases, jaundice, rheumatism and sympathetic affections, and is considered to be a valuable tonic.

*Wedelia calandulacea* (see under *Eclipta erecta*.)

## THE APOCYNACEÆ IN MATERIA MEDICA. —

BY GEORGE M. BERINGER.

*(Continued from page 449).*

BOTANICAL GEOGRAPHY.—Tropical Africa is the principal centre. Oriental and meridional Asia contains likewise many species, but on the contrary, neither to America nor Oceanica can be referred a single specimen. The area of dispersion for each species is quite limited. It is thus, for example, that the *S. hispidus* (if we admit the *S. Kombe* as a variety) and the *S. sarmentosus* are the two single species that occupy in Africa a vast region. It is well, nevertheless, to make some reserves on this subject, as new explorations will largely extend the area actually restricted to certain species. In Africa, *Strophanthus* extends from 16° North to 33° South, and from the one side to the other. But the Eastern side being less explored than elsewhere, does not offer but a few types, which are certainly like, if not possibly only forms of, the Western species (*Kombe*, *Petersianus*, etc.). We find these *Strophanthus* from Zanzibar as far as the Zambesi. Upon the side opposite, the number of the species and their extension are very large. Existing at the Senegal, on the north, we find them nearly as far as the extreme south. But the true region of the African *Strophanthus* extends from Cameroun to Angola, from 5° North to 10° South. We find these in a zone of the coast of which the limit towards the interior of the country is hard to trace, yet, nevertheless, this limit exists. It is in Africa that we find the species of interest to medicine.

In Asia and in Malaysia (some of the Malay Islands contain *Strophanthus*), the limits indicated are 22° N. (possibly 26°, if the *S. Wallichii* exists in the Khasyá Mountains), and 9° S. and 70° to 124° longitude. Here again of seven species two only extend in one area.

BOTANY.—The *Strophanthus* are probably all sarmentose, inhabiting the low grounds, generally in the neighborhood of the large trees, upon which their branches cling after making frequently upon the ground an arch appearing like the rolled, twisted body of a gigantic serpent. The branches extend from bough to bough, leaving, hanging down, wide apart, their fruits, whose diverging carpels resemble great horns, giving to the whole a strange appearance.

The *roots* which we know (six or seven species) are fleshy and

strangulated at distant points. The *branches* are sometimes quite large, with lenticels in the young state. *Leaves* opposite, rarely verticillate, with venation varying, serving for their classification. Upon all of the ærial parts exist occasionally hairs, at times very fine, at other times large, rigid, with a persistent bulb at the base; color varying, ordinarily a russet. Regarding the *flower*, the differences in the length and the consistence of the calyx, the length of the prolongations of the corolla, the form of the ligulary lobes and the appendices of the connectives, are the characters the most important to consider for distinguishing the species.

*Fruit*.—It is always formed of two ligneous follicles, more or less cylindrical or fusiform; sometimes lengthily attenuated, at other times terminating quite abruptly and the size very various, often attaining 0.5 m. (*hispidus*). The two carpels diverging at the proper time and united solely by their base. They form with each other an obtuse angle, or the one being horizontal, form even an angle turned to the rear (*S. divaricatus*). The summit sometimes bears the modified stigma (*S. hispidus*). The base is obtuse, notched toward the insertion of the peduncle.

Externally, the fruit shows an epicarp of a deep reddish-brown or blackish-brown color. The surface sometimes a little villous, frequently strongly wrinkled longitudinally by the drying, and in the majority of the species, numerous lenticels. At maturity, the fruit opens often by a long line longitudinally, the borders of the carpel leaves turning back, separating little by little and leaving the seeds escape. The placenta is formed by two plates which are coalesced, then separate in the same way as the fruit, and describe a curve parallel to the external face of the carpel. The placenta is yellowish and more or less papyraceous.

The endocarp is constituted by a tough plate, yellowish, smooth, which ordinarily easily separates from the exterior region. The natives generally remove the epicarp, and the fruit is then reduced to an endocarp containing the seeds.

Anatomically, the pericarp presents an analogous structure nearly everywhere, the external region is rich in fascicles, some vessels, the most part fibres, surrounded by a network of cells in which are the laticiferous vessels, ordinarily filled with a colored substance. The endocarp is entirely sclerotic.

*Seed* is formed of two parts, the seed or grain proper and the

awn. They are always very numerous in the follicle, ascending, with a micropyle on the outside. From the base, the furrow runs the half way up the ventral face, inserting itself in the funiculus which crosses the yellow membrane covering the placenta and which breaks off close to the seed the moment of the dehiscence of the fruit.

The *seed* proper varies in the dimensions, form, color,\*surface and the anatomical structure. The length is always greater than the breadth, and does not exceed but little over two millimetres. The thickness likewise varies greatly, as also the attenuation toward the extremities. The shape varies within certain limits by the position or insertion of the seed in the follicle. The dorsal face is often more strongly convex than the other. On the ventral face toward the upper part one sees ordinarily the point of insertion of the funiculus (*hilum*), and in several species a raphe more or less clear. The color varies from a greenish-white or yellowish to a dark brown, and is often modified by the hairy covering. In some fruits, dried by fire, the extremities become charred and the color of the seeds changed. The seeds are distinguished as those *glabrous* and those *villous*.

*Glabrous Seeds.*—To this group belong all the Asiatic species and also the rarer African species. Franchet remarks that the absence of hairs upon the seed seems in correlation with a considerable development of the thread which surmounts the anther, and with an awn in which the naked part is shorter than the other. It is likewise noteworthy that Ouabaine is extracted from a glabrous seed and Strophanthine from a villous seed.

*Villous Seeds.*—The hairs on the surface of these seeds are ordinarily short. *S. laineux*, of Zambesi, being the sole exception to this rule. They are applied close to the seed and directed from the base to the top. The color varies, but quite constant for the same species. The lustre is silky and brilliant. Fontaine says that the hairs detach themselves very easily in handling and strongly irritate the mucous membranes of the nostrils and the conjunctiva. The seeds of *Strophanthus* bear two awns; the one at the base sessile, the other at the summit, more or less lengthily aristated. The first is very caducous, and not being observed by some botanists on this account, its existence has been doubted. The upper awn is always greatly developed and forms a straight shaft, rigid and

fragile, of which the inferior part is naked and the upper adorned with long hairs, fine and delicate.

The hairs of the seed and of the awn are alike, excepting the length of the latter, unicellular, and with one long canal running through, ordinarily filled with air. Those of the surface slightly enlarged at the base.

The anatomical structure of the seed is fully described under each species. It is especially important to be well acquainted with the external tegument, because the thickening of the lateral walls of the cells vary in form and characterize the species. The second tegument with a larger number of layers of cells, but ordinarily very flattened, brown and difficult to distinguish, is likewise important. Beneath these is the albumen, relatively greatly reduced and enclosing the embryo. The albumen consists of cells with rather thick walls and contains the oil. The embryo is formed of slender cells, between the two epiderms of the cotyledons. It contains numerous droplets of oil and sometimes crystals of calcium oxalate in macles. Between the albumen and the embryo is a sort of loose tissue, pointed out by Blondel. Finally, numerous laticiferous vessels are near the cotyledonary fascicles and even in the seminal tegument. Starch is very rarely abundant and often absent. The embryo and the albumen contain especially the active principle.

It is generally said that the seeds of *Strophanthus* are inodorous; they are very little odorous in the ordinary condition, but if crushed they exhale a peculiar odor, slightly poisonous, and on contusing in a mortar, one feels quite an irritation of the mucous membranes. The taste is atrociously bitter in the best sorts.

The researches of Fraser, Hanauseck, Helbing and Hartwich on the microchemical characters, permit the recognition of the presence of strophanthine in the seed, and consequently, to estimate rapidly their value. The reaction the most interesting is that given by concentrated sulphuric acid. Helbing proposed to moisten the section with a trace of solution of ferric chloride, then to add one drop of the acid. Sulphuric acid in contact with a trace of Strophanthine gives with this a green coloration, which, according to Fraser, changes in five minutes to a greenish yellow and finally gradually turns to a brownish green from the centre to the periphery in twenty minutes, or from a greenish gray to a dirty brown in one or two hours. Hanauseck described the color reactions of the various parts

of the seed, and concluded wrongly that the embryo contained the fatty oil and the strophanthine, while the albumen contained but the oil. In the good kinds, the albumen gives almost immediately a bright green (occasionally at first blue), the cotyledons a green very much less intense. Then the color passes from a bluish to a red, and finally, paling gradually to a gray with greenish streaks, etc. In the poorer kinds, the albumen gives a green and the embryo becomes green solely in or under the epidermis or around the fascicles, and it is the laticiferous vessels which become so colored. In other sorts, neither the embryo nor the albumen become green, but a red, or sometimes a yellow or brown, due to the action of the acid upon the oil or aleurone. This reaction may be utilized for distinguishing products in appearance very similar.

Hartwich also notes a remarkable relation between the presence of calcium oxalate and that of Strophanthine, which it seems to exclude. In two sorts alone neither are seen, in one only (and which everywhere appears very peculiar by its characters), is found constantly the coexistence of small isolated crystals of oxalate with a trace of Strophanthine. Throughout the others masses of oxalate are abundant in the embryos destitute of Strophanthine.

*Strophanthus hispidus*, A. P. D. C., the *Strophanthus hirta*, Poir.

This is the species which for a long time, and wrongly, was given in Europe the name of *Inee*. The geographic distribution of *S. hispidus* is really very great, because it must probably be admitted that the *S. Kombe* is one form of *S. hispidus*, and Blondel shows that these modifications of the type resembling a variety extend little by little to the West and to the East across the African Continent. But, in materia medica, it is important to distinguish these two forms, not solely by their morphological and chemical characters, but also by their habitat. The limit of the species is from the Cayor, near St. Louis, as far as the back of the Gulf of Guinea, near the Old Calabar River. We may not affirm at present that the plant extends much towards the interior of the country. It seems, however, to meet with the *S. Kombe* in the Nyanza region. Botanically, it is a sarmentose bush, with the branches trailing. It inhabits the ditches or the moist parts always near the large trees. The young branches are covered everywhere, but especially upon the inflorescences and the leaves, with rigid hairs, yellowish-white and with a bulbiform



base. The flowers are accompanied by bracts ; they are said to be white on the exterior ; yellow with streaks of purple on the interior. The segments of the hairy calyx are linear, and their lobes attain to or even exceed the border of the tube of the corolla. This information becomes necessary at least for the comparison with *S. Kombe*.

The *fruits* in the fresh state are formed of two follicles very divergent at maturity. The shape is much elongated, attenuated to a point at the extremity, with an irregular cupuliform stigma terminal. The surface is a dark green. A transverse section of the carpellary leaf shows that the margins of the leaf are coalesced on a level with the ventral suture of the carpel ; these extend in the interior nearly as far as the mid vein, then divert in an arc to each side, forming thus a vast placentary surface upon which nearly 200 seeds are emplaced by their funicules, which cross, before it arrives at the ovule, a thin yellow membrane, covering the placentas.

The fruit arrives at maturity about July ; in September, the desiccation finished, the fruit falls to the ground and the wind disperses the seeds. The dehiscence is along the ventral suture. The fruit is hard, ligneous and resistant. The length varies greatly. When well developed and preserved with the attenuated upper extremity, which is frequently broken off, it attains a length of 50 centimetres, at other times hardly one-half. The shape is generally a very elongated spindle, much inflated about the middle if the dehiscence is much advanced. The upper extremity attenuated lengthily and terminated by a small, irregular, stigmatic plate with sinous border. The lower extremity is strongly notched toward the insertion of the peduncle and the indenting is ordinarily bordered by a rugose ridge quite marked. The cleft is longitudinal and ventral, very long and extends little by little, and finishes by separating and spreading completely the carpels at the base but not at the summit. At the time spread, the carpels attain 4 centimetres in breadth, and about  $1\frac{1}{2}$  centimetres in diameter.

The external surface is strongly wrinkled lengthwise by the drying, the color is blackish-brown, often deeply and sometimes a little greyish or reddish, always dull ; the striations in series and quite fine. The lenticels are ordinarily very numerous, the form rounded, the color dirty white or russet, about the base brown. The surface of the fruit is entirely glabrous. The dehiscence commences at the mo-

ment of plucking, but if the fruit is maintained firmly bound with a band during desiccation, the ventral face shows a simple cleft, long, and straight, fixed by the placentary plates which it separates. The seeds are completely concealed, but the more often the suture enlarges leaving exposed the contents. The placental plate is thin, fragile, papyraceous, color dirty-white or yellowish-white or pale-yellow, smooth and shining upon the internal face, dull toward the exterior, or it is covered with a fine yellow membrane ordinarily not adherent. This is very easily detached from the ligneous part of the fruit, and is often cut in slender strips. The margins of the carpels are then bevelled and slightly turned inward. The internal face of the pericarp deprived of the seeds is entirely different, the color much more clear, brownish to greenish-yellow, it is glossy, satiny and to the touch soapy; it is smooth and very uniform.

Upon a transverse section of the pericarp we perceive two regions very unequal; the external much thicker, is brown, a little deeper towards the exterior, marked by white points quite easily seen. The internal, very thin but very tough, is yellowish, more clearly distinct than the other, from which it is easily separated. In commerce, the fruits are often reduced to this internal layer.

STRUCTURE OF THE PERICARP.—The *external zone*, thick and brown, is constituted by a parenchyma of irregular cells, upon section, very flattened, sinuous, containing the brown coloring matter. In this tissue we find:

- (1) The fibro-vascular fascicles.
- (2) The fascicles of long fibres, yellowish-white, very strongly sclerified, with linear lumen.
- (3) Abundant laticiferous vessels with a colored juice, more or less red, with thin walls, a sinuous passage.

The *internal zone*, yellow, brittle and thin, is formed of sclerotic elements, very difficult to cut; the fibres which constitute this are disposed in two directions; the external (1 or 2 layers) longitudinally, the internal transversely, these last somewhat entangled. The placental plates are proportionately richer in fibres and poorer in parenchyma. The placentas present only the longitudinal fibres, the external side from which departs the funicules, with tracheæ and laticiferous vessels, and on the internal side the membrane is limited by one layer of very large fibres. The thin membrane which covers the placentas with two cellular planes, with here and

there solely a little intermediary parenchyma; the external zone accompanies the funicules in their "sortie," it is then formed of irregular cells.

DESCRIPTION OF THE SEED.—The shape is always lanceolate, but occasionally asymmetrical, often with margins a little distorted, always attenuated lengthwise in advance, and often quite pointed in the rear; but this lower extremity is subjected to variations rather great in the same fruit, and the seeds are abundantly rounded. The size fluctuates from 10–17 millimetres in length by 2–3 millimetres in breadth and 1–1.5 millimetres in thickness. The size not only varies, but also the proportion, certain seeds being relatively broad and flat in comparison with their length.

The *raphe* always little or not at all visible excepting sometimes entirely at the top. The *hairs* very numerous, not very near together, color a golden brown, brilliant, velvety, changing in color with the illumination, short but visible to the naked eye, direction from base to the top. The passage from the seed to the awn is badly limited. The awn is relatively long, the part naked at times very straight, at other times and often a little sinuous, always very fragile, quite dark in color, and varying from 15–18 millimetres to about 28 or 30 millimetres. The plumed part about 25–28, 30 to 35 millimetres, it being a little longer.

The hairs of the awn are very long and frequently attain 5 centimetres; they are spreading, silky, fine, delicate, brilliant, whitish, with the base slightly yellowish; in mass a little yellowish.

On macerating the seed in water, we may separate (1) the seminal envelope, thin, colored, villous; (2) the whitish albumen, cartilaginous, resistant, in the form of a sac, quite transparent, appearing to be laid around the embryo; (3) the white embryo friable with two oval cotyledons, with a long and slender radicle.

ANATOMICAL STRUCTURE.—(a) *Tegument*.—The first cellular layer is formed of cells with thickened membrane especially following the lateral walls, each cell becoming circular by a thickening parallel to the external surface. Upon the section, these thickenings coalesce the two neighboring cells appearing as a convex lens, quite clear, yellowish, with a vertical line of separation. Between these solid lateral walls the upper face of the cell is ordinarily depressed, so that the cellular zone is undulated and as if lifted between pillars. Viewed from the face this layer is formed of cells more or less quad-

rangular, a little elongated, with thickened walls and quite wavy. The hairs of the seed start from this zone, they are very small, short, unicellular and extremely fine. With the microscope they appear nearly colorless, while the cell wall is colored a yellow-brown.

Beneath is a zone formed of cells very strongly flattened and little visible unless swollen a little by reagents. These elements are elongated upon the section parallel to the surface. The contents are brownish and the cell walls are thin and colored.

(b) *The albumen*, with polyhedral cells, quite irregular, with thick walls; the first layer under the seminal tegument is more regular. The last with its external walls much thickened. In these cells are the droplets of oil. Between the albumen and the embryo we see also that which was pointed out by Blondel, some tracings of cells.

(c) *The embryo* presents nothing special; it is nearly analogous in all the *Strophanthus*. It does not contain any oxalate.

Placed in contact with concentrated sulphuric acid, the albumen and the embryo act with a little difference, which proves at times the more the inequality in value of the seeds according to the origin, and the probability that the forms or the species are multiplied under a single name. In the most of these seeds, the green coloration is produced very rapidly, at other times much more slowly. The color is very deep green throughout, nearly black. This changes quickly to a coloration rather varied, but ordinarily violet or violet-red, sometimes yellow. The embryo becomes colored green more slowly than the albumen, less strongly and sometimes hardly at all. The final color is also violet or blue. Generally, at the end of a few minutes, the entire section is violet.

#### STROPHANTHUS MINOR.

*Strophanthus Minor* Pax. *Strophanthus* of the *Niger* Blondel. There arrived in England under the name of *S. hispidus* or under that of *Strophanthus* from the *Niger* numerous mixtures in which one could distinguish: The true *hispidus*, a nearly related form, but different, for which Blondel retained the name of *Strophanthus of the Niger*; a third sort discovered later and named by Blondel *S. minor*, and from our present knowledge we suppose that these mixtures are still more complex. However, Pax, Franchet,

etc., reunited *S. niger* and *S. minor*, and founded a species probably near to *S. hispidus*, but upon which the botanical information is faulty (we know but the fruit and the seeds only). It also approaches *S. sarmentorus*, and specimens examined by the author are considered far from proving that *S. Niger* was a synonym for *S. Minor*; further botanical research in this mysterious region of the Niger may possibly show two or even more species. This, or these, species approach the *S. hispidus* and inhabit the same regions. In the type of *S. Niger* Blondel the follicles are very strict, measuring nearly 15 millimetres in diameter, 32 centimetres in length, or even more, the extremity being broken off. Externally, color brown, quite clear, but the fruit was incompletely scraped. According to Blondel, the parts not scraped are a dirty earthy gray or reddish. The pericarp of *S. Niger* Blondel offers some anatomical differences from the *hispidus*: in the fibrous zone, the cells of the parenchyma are less compressed and laticiferous vessels are more localized about the vascular fascicles, and these, here, are much developed. The fibres are less numerous and with very large lumen. In the elastic zone the dimensions of the fibres are larger, and in the external longitudinal layer are much thicker than the internal. The most constant difference between these seeds and those of the *hispidus* is, perhaps, the proportion between the naked part and the plumed part of the awn, the first becomes here quite sensibly larger than the second, and it is questionable if this shaft is removed (as often is the case in commerce), if the distinction is possible. It is true that the size is smaller in the form known as *minor* (8-14 millimetres in length), but it is larger in the form *Niger*, and has much the covering and the size of seeds of the *S. hispidus*. The raphe is here more visible than in the *hispidus*, and extends over two-thirds of the seed. The hairs of the seed are quite similar, but are possibly less hard and fall very easily. The color of the surface is a brown, at times light, at other times deep, nearly violet. When the seed is of a certain size, the hairs being broken, the raphe easily seen and the color light, the confusion with *S. glaber* of Gaboon becomes possible. The form plano-convex indicates, however, that it is remote. The more rounded shape of the base will not serve, because many of the seeds of *S. hispidus* are likewise rounded. The single point that may be brought forward is the relative breadth of the seed compared with its length; the seed of the *minor* is broader

and much flatter, rather oval than truly lanceolate. Another distinction is established upon the fracture, the taste and the anatomical structure.

The perisperm is very thin, the albumen strongly cartilaginous and transparent, the embryo with thick cotyledons, white, opaque, with a long radicle. The shaft is pale yellow. In a specimen from Holmes, labelled S. from the Gold Coast, *S. minor* Blondel (?) its tendency is to split longitudinally from the summit to the base. Concentrated sulphuric acid placed in contact with the seed of the specimen from M. Blondel comports itself nearly as with the *S. hispidus*; the albumen is colored green, gradually very deep, nearly black; the embryo only a little more slowly, some parts more deeply colored indicate the regions of the fascicles. The color changes gradually to a violet. In the specimen from Holmes the coloration is not shown; it gives only a yellowish tint, then a rose. This seed is rich in oxalate.

[*To be Continued.*]

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## AN OLD BUT FLOURISHING BLUNDER IN MEDICAL CHEMISTRY.\*

BY CHAS. W. FOLKARD.

"Lithic urate is more soluble than any other of these salts (the urates). Hence, lithia water is occasionally prescribed to gouty patients and to others who suffer from a superabundance of uric acid." . . . .

The above is an extract from p. 773, Part III, of Miller's "Elements of Chemistry," fourth edition, published in 1869, and there is sufficient semblance of truth in it to mislead those who are able to devote but a few months to the study of chemistry, as is the case with the majority of medical students.

Although the paragraph quoted was omitted in the new edition published in 1880, it would seem that no attention was called to the subject, for sufferers from a too abundant secretion of uric acid have been treated up to the present time on an erroneous assumption, proceeding from the "little knowledge" which is admittedly so

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\* From *Chemical News*, 70, 99.

dangerous, and which is also doubtless responsible for the practice of exhibiting chlorate of potash in cases of blood-poisoning, "to oxidize and destroy the poison in the blood," whereas every chemist is aware that in an alkaline solution like the blood the chlorate of potassium is practically as stable and inert\* as the chloride, or as common salt.

In these remarks the writer disclaims the idea of censuring the members of the medical profession, because these are chemical subjects, and if blame be due anywhere it must undoubtedly fall upon chemists for neglecting to point out to the members of an allied profession the absurdities involved in these two cases.

There is, however, one great consolation for the uric acid and pyæmia patients who have been wrongly treated, viz.: that both lithia water and chlorate of potash\* are (so far as we know) harmless—quite unlike the copious blood-letting and salivation treatments of a by-gone age.

At the same time it must be remembered that the use of valueless "remedies," however harmless in themselves, hinders or altogether prevents the search for real and rational ones. The sooner, therefore, attention is drawn to them the better for the patients, even should there be nothing to propose in lieu of those discarded.

Although the absurdity of the lithia water "bull" merely requires to be mentioned to a trained chemist to be at once recognized, it may be as well to give a few details.

In the first place, the substitution of lithium for sodium in the animal economy would probably be by no means an unimportant change. Physiologists have found that the substitution of the blood of one animal for that of another is possible in the case of allied species, but in that of animals belonging to different genera the change may be followed by immediate death. In all probability, therefore, it would be a very risky proceeding to convert the albuminate of sodium in human blood into albuminate of lithium, even if it were possible. Fortunately for the patient, however, this is as likely to be successful as the notion regarding the medicinal use of free phosphorus, viz.: "the brain contains free phosphorus, and the

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\* While it is true that potassium chlorate is stable in alkaline solutions, yet it must not be forgotten that in doses of ten to fifteen grams it is an irritant poison.—*Editor of AM. JOUR. PH.*

more brain-work the more of that element is excreted. Therefore, to restore brain waste, give phosphorus pills." Such a crudity as this would be scouted, even as regards the mineral kingdom, *e. g.* in the simple—or comparatively simple—operations of metallurgy.

In the second place, the question of quantity may be considered. As a bottle of lithia water contains about five grains of lithia, it is chemically equivalent to about ten grains of soda.

The quantity of blood in an adult being about 100,000 grains, and containing about 294 grains of chloride of sodium, equivalent to about 156 grains of soda, it would evidently require fifteen or sixteen bottles of lithia water to replace the soda by lithia, supposing that sodium salts were absent from the food.

From the quantity and composition of the urine, however, we know that about 140 grains of common salt, equivalent to about seventy-five grains of soda, are excreted every twenty-four hours, derived, of course, from the food. It follows, therefore, that from seven to eight bottles of lithia water would be required every day for the sole purpose of dealing with the sodium salts introduced in the food.

These results are conclusive as to the value of the present practice.

To the chemist, however, the above figures are superfluous. He knows that the tendency is towards the formation of the more insoluble, not of the more soluble, compounds; and that for lithia to be of any service in avoiding deposition of urates in the joints or bladder, all bases which form compounds with uric acid of less solubility than lithic urate (potassium, sodium, ammonium) must be absent.

If we have a solution containing a phosphate, a magnesium salt and free ammonia, we know that in a longer or shorter time a precipitate of ammonio-magnesian phosphate will take place, and the only way to prevent it is to ensure the absence of one of the constituents of the precipitate. We cannot argue "phosphate of potassium is more soluble than ammonio-magnesian phosphate, so by adding a salt of potassium to the solution we shall prevent the formation of the very sparingly soluble magnesium compound," and yet that is the assumption with regard to the medicinal use of lithia water.



It is a chemical exemplification of the truth of the old proverb about one man being able to lead a horse to the water, etc. It would be extremely convenient as regards uric acid patients if lithia water could be made to act in this way, but the laws of chemical combination do not admit of it. The medical profession, therefore, must recognize the fact, and seek elsewhere for a remedy or palliative for their patients.

An analogous case occurred in the gas world, where gas engineers strove for many years to purify the gas from bisulphide of carbon vapor by means of sulphide of calcium; and, *at the same time*, endeavored to make the spent lime inodorous by converting it into carbonate before taking it out of the purifier. Here, again, it would have been very convenient if carbonate of calcium could have been induced to combine with carbon bisulphide, but it is hardly necessary to remark that the attempt was a failure.

Although it is a matter for regret that the science of therapeutics should be in such an elementary stage in the nineteenth century, still the physician is but in the same predicament as the chemist whose work lies in the vegetable and animal kingdoms. Take, for example, the apparently simple question of water analysis. The intellect of the civilized world for fifty years or more has been unable to devise a process (physical, chemical, microscopical or biological) which will enable the operator to say with certainty: "This water is wholesome." There are several processes which are capable of detecting a bad water, but in many cases this can be done by the senses alone, and so recourse must be had to indirect methods, such as ascertaining the mortality and sickness amongst the people who use the water, or examining the source as to the probabilities of pollution. Little wonder, then, that medical science is frequently baffled in the attempt to deal with the complex problems of human pathology. Mineral analysis is but child's play compared with the study of morbid actions taking place in closed vessels, suspended in another closed vessel, the walls of all of them being opaque.

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There are a few pomegranates from California in the market, but evidently the growers of that state have not yet learned to raise this fruit successfully, as the specimens sent to the eastern markets are quite inferior in appearance and flavor to the imported ones.

## EDITORIAL.

## THE PATENT MEDICINE TRAFFIC.

The pharmacist of the present generation is paying the penalty for the sins of his predecessor. Under the stimulus of thirty-three and sometimes fifty per cent. profit this unskilled and often uneducated apothecary of several decades ago recommended patent medicines as the readiest means of supplying the demand frequently made by customers for a remedy for this or that ailment. In this way he helped the manufacturer to introduce his remedies, and gradually educated a certain class of the American public to use this form of medication.

Now, the manufacturer, by the liberal use of printers' ink, compels the unwilling pharmacist to hand out his wares at no profit, but rather in some cases at a slight loss.

*Instead of pharmacists combining to maintain prices, has not the time come for them to form a league to discontinue the sale of patent medicines?*

The manufacturer has always dreaded this action, and all of his "plans for relief" have been coupled with a requirement that the pharmacist should sell just what is called for.

It is difficult to foretell the result of such action, but it could not injure the pharmacist, since his revenue from that source has probably ceased forever.

The writer does not offer this plan as entirely new; the suggestion has been made before; but all other "plans" having failed, why should not this one be adopted as the last and only way out of the difficulty?

As it took years to educate the public to use patent medicines, so it will take years to right that error.

The patent medicine is a canker on the professions of pharmacy and medicine, and a curse to the community at large.

## THE ALCOHOL TAX.

It was stated in the October number of this journal that the section on commercial interests at the meeting of the American Pharmaceutical Association decided to advise against removal of the tax on alcohol, except in those cases where its chemical character undergoes a change, as in the preparation of ether and chloral. This unaccountable action of the section looks so much like the entering wedge, whereby the manufacturer will get free alcohol, while the pharmacist will be compelled to continue to carry the burden, that so far as we have heard, it has met with the universal disapproval of pharmacists throughout the country.

At a recent meeting, held in the Philadelphia College of Pharmacy, and attended by a number of representative pharmacists of the city and vicinity, there was not a voice heard in support of the action of the American Association. Mr. Joseph W. England read a paper on *Tax-Free Alcohol*, which was recently published in the *Alumni Report*, and a committee was appointed to take such action as might be necessary to secure justice to the apothecary.

It is obvious to all but the dullest intellects, that the demands of justice can only be met by giving to the smallest user of alcohol, for medicinal and scientific purposes, the same privilege that is accorded the largest manufacturer.

#### THE AMERICAN PHARMACY FAIR.

We have recently received the official announcement of this undertaking, and can give it our hearty encouragement. It will be held in Mechanics Building, Boston, during May, 1895, and has been endorsed by a large number of prominent New England pharmacists.

This fair has been projected with the object of promoting the commercial and educational interests of pharmacy throughout the New England States.

The total area of floor space is six acres, and exhibitors will be granted a number of privileges.

Benjamin Johnson has been chosen General Manager and Permanent Chairman of Advisory Board, and D. A. O'Gorman has been selected Permanent Secretary. The Advisory Board is composed of such well-known men as Prof. E. L. Patch and Messrs. H. M. Whitney, Wm. F. Sawyer, S. A. D. Sheppard, F. H. Butler, Charles C. Williams, Henry Canning, G. W. Cobb, N. W. Stiles, J. Allen Rice, W. C. Durkee and Prof. W. L. Scoville. The office is at 3 Franklin Street, Boston, Mass.

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#### REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*The Practice of Pharmacy.* By Joseph P. Remington, Ph.M., F.C.S. Third edition, enlarged and thoroughly revised. J. B. Lippincott Company. Philadelphia, 1894.

From 1,080 pages in the first edition of this work it has now grown to 1,448 pages, and exceeds in size the earlier editions of the United States Dispensatory.

It is evident at a glance that an immense amount of labor has been bestowed on the preparation of this edition, following as it does the recent issue of the Pharmacopœia.

Among the noteworthy additions, that one of a "Glossary of Uncommon Names, Terms or Substances," is sure to be appreciated. We note with satisfaction a concise and systematic treatment of the new synthetic remedies; too much credit cannot be given to this feature, for it at once furnishes the pharmacist with desirable information about the composition, properties and dose of substances, concerning which information is often needed, and difficult to find.

The metric system has been adopted in the numerous working formulas, but it has been accompanied by the equivalents in fluid ounces, troy ounces, drachms and grains. Evidently the author did not see his way clear to arbitrarily ignore the old system, but we hope the time is not far distant when all scientific works will absolutely adopt the metric system.

Sixty pages of index complete this comprehensive volume, and serve to fulfil the claim made for it that it is the handbook of the pharmacist, the physician and the student.

*Handbook of Pharmacy*, embracing the theory and practice of pharmacy and the art of dispensing. For students of pharmacy and medicine, practical pharmacists and physicians. By Virgil Coblentz, Ph.G., A.M., Phil.D. With 395 illustrations. P. Blakiston, Son & Co. Philadelphia, 1894. Pp. 480.

This attractive volume is a credit to both author and publisher. It inclines to the chemical side of pharmacy, and is especially strong in its description and illustration of the manipulations incidental to the everyday life of the pharmacist. Twenty chapters of these operations serve to make up Part I; Part II is devoted to galenical pharmacy; Part III considers the art of dispensing, and Part IV volumetric analysis. An appendix is compiled from the various pharmacopœial tables.

Books on pharmacy are not so numerous in this country that we may pass over them lightly, and this one is especially welcome, since it considers the subject in a scholarly manner that is sure to be appreciated.

*Consular Report*. Vol. 46. No. 168. September, 1894.

Occasionally in these reports we are treated to rather stale information, especially when the consul gathers his information from the scientific literature of the country in which he is located, this literature having in many cases been abstracted from the original papers which were published long before in this country or England. It is very desirable, therefore, that consuls should confine themselves strictly to facts gathered from their immediate locality.

The number before us is full of practical information, and is especially full in statistics of our imports from a number of foreign countries.

The articles that are of interest to pharmacists are, twenty pages devoted to the eucalyptus tree, five pages to the adulteration and analysis of essential oils, and something over two pages devoted to tea culture in Japan.

*Proceedings of the Thirteenth Annual Meeting of the Virginia Pharmaceutical Association*, held at Blue Ridge Springs, Va., July 10, 11, 12, 1894.

The members of this association evidently had a good time, but managed to devote some of it to the consideration of scientific contributions on "Cream of Tartar Adulteration," and "Morphine and Opium Poisoning and Permanganate of Potash as an Antidote," by G. E. Barksdale; "The Unity of Matter," by Gordon Blair; and "What is the Plant Used in Domestic Practice in Virginia, called 'Sarsaparilla'?" by C. B. Fleet.

This last paper is especially creditable, and informs us that *Menispermum Canadense* is generally sold in that State when sarsaparilla is called for, and from its chemical constituents, as determined by Professor Maisch, we may safely assume that it is superior in medicinal value to the true sarsaparilla.

*Proceedings of the Nineteenth Annual Meeting of the Georgia Pharmaceutical Association*, held in Americus, Ga., May 8 and 9, 1894.

This is evidently what is known as a live association, and the proceedings are condensed into a dainty volume. A few papers were read, the most noteworthy one being by J. W. Goodwyn, on a solution of ferrous iodide from which to prepare the syrup, and containing hypophosphorous acid, as directed by the National Formulary.

*Plantæ Novæ Hispaniæ*. Editio secundus. Autoribus Martino Sessé et Josepho Marianno Mocino. Mexico, 1893. Received from Prof. Alfonso Herrera.

*Report of the Board of Managers of the Pennsylvania Hospital.* 1894.

*Proceedings of the Eleventh Annual Convention of the National Confectioners' Association of the United States*, held at Boston, July 10, 11 and 12, 1894.

Some interesting information about adulteration of candies may be gleaned from this report.

*Annual Report of the Alumni Association of the St. Louis College of Pharmacy.* 1894.

*The New United States Customs Tariff.* In effect August 28, 1894. By J. W. Hampton, Jr., & Co., Philadelphia and New York.

A handsome pamphlet of seventy-five pages, containing the most desirable information about the tariff schedule.

*Minnesota Botanical Studies.* Conway MacMillan, State Botanist. Contents: "On a New Registering Balance," by Alex. P. Anderson; "On a New Electrical Auxanometer and Continuous Recorder," by W. D. Frost; "Titles of Literature Concerning the Fixation of Free Nitrogen by Plants," by D. T. MacDougal.

*The Spatula* is the title of a small, handsomely illustrated journal which has just made its appearance in Boston. It chiefly concerns the trade and news side of the pharmacist's life. The peculiar dash and freshness of its editorial columns, and its well-executed illustrations ought to make it a permanent and welcome visitor to relieve the monotony of the long hours which tie down the pharmacist.

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## MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, October 16, 1894.

On motion, Mr. E. M. Boring was called to the chair. The minutes of the last meeting having been printed in June, their reading was dispensed with.

Messrs. H. O. Wilbur & Sons presented, through Mr. Tilton, one of our graduates, samples of nearly every commercial variety of cacao; it was from these samples that Professor Bastin made his study of the starches of the cacao, which was published in the August number of the JOURNAL OF PHARMACY. A sample of English oak bark, *Quercus robur*, was presented by Professor Trimble, and one of live oak bark, *Quercus virens*, from Mississippi, by Mr. E. D. Heine.

Mr. C. H. LaWall read a paper upon *Ointment of Mercuric Nitrate*, see p. 525. Inquiry was made as to the temperature which the mixture attains when the acid nitrate is added. Lard oil, it was thought, is by far the best material for making the ointment, but the frequent adulteration of this oil with cotton-seed oil makes it important to observe caution in purchasing a pure article. The experiments of Mr. LaWall were endorsed by Mr. L. F. Kebler, who thought it would be well to rely upon the nitrate of silver test for cotton-seed oil.

It was inquired if there was any method of preventing the granular condition which is so common in this ointment as it becomes older; it was thought the best that could be done was to rub it up upon a slab with a muller before dispensing.

One member said that a preparation made with vaseline as the base was the nicest he had ever seen, and he had known it to be applied both by practitioners and others with the most satisfactory results.

The paper was referred to the Committee on Publication.

Mr. Joseph W. England read a paper on *Tax-Free Alcohol*.

The paper elicited a very lively discussion, and it was thought that the interests of the retail pharmacists had never been properly brought before the Government, that it was unworthy a government like our own to admit that the fraudulent use of tax-free alcohol could not be controlled. Other nations, notably England, France and Germany, were able to do so, and so could ours.

It was the sense of this meeting that a strong effort upon the part of the retail pharmacists throughout the entire land should be made, and that we should emphasize our opinions on this subject, that there was no class in the community who were so heavily burdened in proportion to their business ability to bear such taxation, and that the best of reasons, both ethical and commercial, made such an appeal for relief most important for us.

A series of resolutions were read by Mr. Robt. England, as follows:

WHEREAS, Alcohol enters so largely into the making of medicinal preparations, is at present of such excessive cost, due to the continuance of an internal revenue tax which results in making a product worth but 53 cents a gallon cost \$2.50, and its lessened cost would be of great benefit to the public and the pharmacist alike; and

WHEREAS, Congress at its last session passed the Hoar Bill, making alcohol tax-free when used for manufacturing medicinal preparations, after regulations to be prescribed by the Secretary of the Treasury had been satisfactorily complied with; and

WHEREAS, These regulations have not been issued, and it is believed will not be, on the ground that the law is defective and that Congress has failed to provide sufficient funds to carry it into effect; therefore,

*Resolved*, That we, the Philadelphia College of Pharmacy in pharmaceutical meeting assembled, place ourselves on record as favoring tax-free alcohol for manufacturing medicinal preparations, believing that practicable regulations can be devised whereby the Government can be adequately protected against fraud, and pharmacists, and the public indirectly, be given the almost priceless boon of tax-free alcohol; and

*Resolved*, That we urge the pharmacists of Philadelphia and of the country at large, to earnestly appeal to their Congressional representatives to prevent, at their next session, the repeal of the law, to amend it if necessary, and to pass if needed, a sufficient appropriation to put it into effect; and,

*Resolved*, That these resolutions be entered in full upon the minutes of this meeting, and printed in the *American Journal of Pharmacy* and the *Alumni Report*.

G. M. Beringer seconded the resolutions, and said that according to the newspaper accounts the Secretary of the Treasury had conferred with representatives of the wholesale drug trade, the manufacturing pharmacists and the manufacturers of proprietaries, but not with the retail pharmacist. The American Pharmaceutical Association was generally supposed to voice the sentiments of the retail drug trade. In the past this association had repeatedly adopted resolutions in favor of tax-free alcohol for pharmaceutical purposes and had

memorialized Congress to grant the same. He was surprised to learn that at the recent meeting at Asheville, N. C., this same association had passed a resolution recommending the Secretary of the Treasury to so construe the law as not to admit of free alcohol being used for the purposes of the pharmacist. This action was not in harmony with their past labors, and the reason for such was beyond our comprehension, as it certainly did not correctly present the views of the retail pharmacists of America. Whatever the regulations that might be adopted, they should be so framed as to place the retail pharmacist, who purchased his alcohol in 10-gallon cans for the purpose of manufacturing pharmaceutical preparations, on the same level as the larger manufacturer who purchased alcohol by the carload. Any plan which would not include the smaller manufacturer would be manifestly unjust and the worst kind of class legislation.

The resolutions were then taken up and considered singly, and finally adopted as a whole.

It was moved and seconded that a committee of five be appointed to prepare a paper embodying our views, and have it sent to the druggists of the whole country, and that it be referred to the publications of the College.

The chair appointed

MR. G. M. BERINGER, *Chairman*.

RUSH P. MARSHALL,  
WM. MCINTYRE,

J. W. ENGLAND,  
ROBERT ENGLAND.

Professor Trimble called attention to an improvement in the microscope, made by our fellow-member, H. M. Wilder (see page 523), which consists of a revolving sub-stage, contrived to furnish four different kinds of illumination by the condenser, the dark back-ground, the polarizer and simple illumination.

The meeting then adjourned to visit in the Microscopical Laboratory.

T. S. WIEGAND, *Registrar*.

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## OBITUARY.

*Jacob Hoch*, Ph.G., Class of 1891, died at the residence of his sister, at the old Hoch Homestead, on the Easton Road, near Easton, Pa., on Saturday, September 22, 1894, of heart disease, in his 27th year. He received his early education in the public schools near Easton, Pa., and learned the drug business with Milton M. Buss, Ph.G., at South Bethlehem, Pa., remaining with him from 1886 to 1889; in the latter year he came to Philadelphia, and entered the employ of Wm. H. Lantz, corner Seventeenth and Columbia Avenue. He attended the Philadelphia College of Pharmacy in 1889, '90 and '91, and graduated with the Class of 1891. He entered into business for himself in April, 1893, at No. 3913 Lancaster Avenue, which he carried on successfully until a few days before his death, when he sold his store and was taken to the residence of his sister in Easton, Pa., on Tuesday, September 18th, and died suddenly with heart disease on Saturday, September 22d, although he had been suffering with consumption during the past year. He was a young man of good character, and had many friends both in his native place and in Philadelphia, who received the news of his death with much sorrow. He was a mem-

ber of the Alumni Association. His funeral took place from the residence of his sister, 1816 Butler Street, Easton, Pa., on Wednesday, September 26, 1894, and his remains were interred at Farmersville Cemetery.

*Samuel S. Jones*, Ph.G., Class of 1886, was born at Wilkes-Barre, Pa., June 16, 1864, and died in Rio Janeiro, Brazil, March 11, 1894, of yellow fever, aged twenty-nine years, eight months and twenty-three days. He received his early education in the public schools of his native city, and in early life began to learn the drug business with Mr. T. Jones, at Scranton, Pa., and also received instructions from Dr. Robitham, after which he entered the employ of Millard F. Cyphers, and remained with him until the fall of 1884, when he came to Philadelphia and matriculated in the Philadelphia College of Pharmacy as a Junior, and passed successful examinations both in his Junior and Senior years, and graduated with honor in the Class of 1886. His thesis was entitled *Xanthoriza apiifolia*. After his graduation he returned to Wilkes-Barre and entered the employ of Mat. Wolfe & Co., and for some years previous to his death was a member of that firm. He had gone to Buenos Ayres in November, 1893, and from there to Rio Janeiro, on his homeward journey, when he was taken with the dread disease, and was removed from his boarding-house to the hospital, where he died, and his remains were interred in that far-off land.

He was married June 3, 1891, and leaves a young widow, an aged father and mother, five sisters and two brothers, to mourn his early and sad death. He was of a genial nature, and made many friends while attending College, who will hear of his death with sorrow.

## NOTES.

The difficulties in the cultivation of black pepper in the West Indies have been successfully overcome in Trinidad, as we learn from a Bulletin (No. 23) of the Royal Botanic Gardens. A crop of some 200 pounds has been harvested, and samples have received highly satisfactory valuation.—*Botanical Gazette*.

### TANNIGEN.

This is the name of a new remedy described by Dr. Hans Meyer (*Pharm. Zeitung*, 39, 568). Schiff in 1873 prepared a pentacetyl derivative of tannin, by heating together, for several hours, tannin and glacial acetic acid. The compound designated by the name tannigen is also an acetyl derivative of tannin, but differs from the compound of Schiff by only having two of its hydroxyls replaced by two acetic residues.

The author does not state how this difference may be attained. Tannigen occurs as a grayish-yellow, tasteless and odorless powder, slightly hygroscopic. It melts when dry without decomposition at 180° C. When heated with water to 50° C. it forms a viscous mass. It is not sensibly soluble in cold water or in dilute acids, slightly soluble in warm water and in ether, and freely soluble in alcohol, dilute solutions of sodium hydrate, phosphate, borate, etc.

According to the author it may be given in moderately large doses without inconvenience. It is not dissolved in the acid liquids of the stomach, but passes into the intestines where, on account of the alkaline liquids present, it dissolves and exerts its effects. It is recommended for chronic diarrhoea, in doses of 0.2 to 0.5 gramme, three times a day.





# THE AMERICAN JOURNAL OF PHARMACY.

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DECEMBER, 1894.

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## ON SOME OF THE TESTS FOR QUININE.

BY THEODORE G. WORMLEY, M.D.

The recognition of quinine by chemical tests, when present in notable quantity, is usually a matter of great ease. Under certain conditions, however, as in its extraction from complex organic mixtures or from the tissues, it may be recovered only in minute quantity, and its presence may then not be so readily determined, at least by purely chemical tests. Among the strictly chemical tests for this substance, the *thalleioquin* reaction as it is termed, is one of the most characteristic, and at the same time one of the most delicate. This test, however, requires caution in its application, since it may give a negative result even in the presence of quinine in considerable quantity.

### I. THALLEIOQUIN TEST.

This test was first proposed by Prof. M. Andre, of Mentz, in 1835,<sup>1</sup> and consists in the production of a bright emerald green coloration when a solution of a salt of quinine is treated with chlorine water, followed by the addition of a little aqua ammonia. M. Andre observed that this order of the application of the reagents was necessary for the production of the green color.

R. Brands, in 1839,<sup>2</sup> more fully examined this reaction and found that the production of the green color was dependent upon the presence of the substances employed in certain proportions, otherwise it did not appear. He found that the chlorine caused a

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<sup>1</sup> See this JOURNAL, viii, 208.

<sup>2</sup> See *Ibid.*, xi, 36.

decomposition of the quinine which varied with the amount of chlorine employed, and thus determined whether a green precipitate would be produced, or the liquid simply acquire a green color or become yellow.

The green precipitate thus produced was found to have a bitter taste similar to that of quinine; was insoluble in cold water and only sparingly soluble in boiling water; insoluble in ether, but readily soluble in alcohol, and readily soluble in diluted acids forming red solutions, from which it was reprecipitated of a green color on neutralizing the solution with ammonia.

In 1853, A. Vogel<sup>1</sup> proposed to modify this test by treating the quinine solution after addition of chlorine water, with a solution of potassium ferrocyanide and then adding a few drops of ammonia, when the mixture would assume a deep red color, the green color not appearing.

Professor Flückiger, in 1861, confirmed the observation of Vogel and found that the same red coloration might be produced by substituting potassium ferricyanide for the ferrocyanide.

More recently, Chas. F. Zeller<sup>2</sup> has examined this test in regard to the production of a green coloration under the action of chlorine and ammonia, and confirmed the observations of Brands, namely: that the results were influenced by the relative proportion of the substances employed.

It being thus shown that this test was much influenced by the relative proportions of quinine and chlorine present, the following investigations were made for the purpose of more definitely determining the range within which the green coloration would manifest itself in different quantities of the same solution, and in solutions of different degrees of dilution.

The quinine was employed in solution both as sulphate and hydrochloride, the 1-100th solutions being prepared by dissolving, by the aid of just sufficient of the diluted acid to effect solution, 1 gramme of the pure alkaloid in 100 c.c. of water. The more dilute solutions were prepared from the 1-100th solutions, by the required dilution with water.

The chlorine water consisted of a saturated aqueous solution of

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<sup>1</sup> This JOURNAL, 1853, 516.

<sup>2</sup> See *Ibid.*, 1880, 385.

the washed gas. This solution, for uniformity of results, should be freshly prepared and preserved from the action of light. When this reagent was used in the form of drops, these were delivered from a pipette delivering on an average twenty-five drops per cubic centimetre. The ammonia employed had a density of .950.

A. 1-100th solution of quinine.

1. 5 c.c. of this solution (= 50 mgms. quinine) yields with:

(a) 0.1 c.c. of chlorine water: a colorless solution which, on the addition of a drop of ammonia, yields a copious white precipitate (of quinine), and after a little time, the mixture acquires a rose-red color; on the addition of a second drop of ammonia, the mixture becomes colorless, then slowly assumes a greenish hue which becomes well marked.

(b) 0.5 c.c. of chlorine water, followed by a drop of ammonia, yields a copious white precipitate, and the mixture quickly assumes a green color, then becomes dark rose-red and finally green.

(c) 1.0 c.c. chlorine water and a drop of ammonia: an immediate green color, which quickly changes to dark red, then to purple or blue.

2. 1 c.c. of a 1-100th solution (= 10 mgms. quinine) yields with:

(a) One drop chlorine water and then a drop of ammonia: a copious white precipitate, which quickly assumes a green color.

(b) 0.5 c.c. chlorine water and a drop of ammonia: an intense green coloration.

(c) 1.0 c.c. chlorine water and one drop of ammonia: a bright green coloration, which becomes darker in color and finally nearly black.

3. 0.1 c.c. of a 1-100th solution (= 1 mgm. quinine) in a very small, narrow test tube, yields with:

(a) One drop of chlorine water and a drop of ammonia: a copious green precipitate.

(b) Two drops chlorine water and a drop of ammonia: a bright green coloration.

(c) Three drops chlorine water and a drop of ammonia: no precipitate, but the mixture immediately acquires a bright green color, which quickly darkens.

## B. 1-1000th solution of quinine.

1. 5 c.c. of the solution (= 5 mgms. quinine) yields with :
  - (a) One drop chlorine water and a drop of ammonia : a white precipitate (quinine) which quickly assumes a greenish hue, slowly changing to well-marked bluish green.
  - (b) 0.1 c.c. chlorine water and one drop of ammonia : the precipitate quickly acquires a strong, bluish-green color.
  - (c) 0.5 c.c. chlorine water and a drop of ammonia : an intense, emerald-green coloration.
  - (d) 1.0 c.c. chlorine water and one drop of ammonia, no precipitate, but a strong yellow coloration, which soon changes to deep purple.
  - (e) 2.0 c.c. chlorine water and a drop of ammonia, a colorless mixture ; on further addition of ammonia, a dirty-brown coloration may be produced.
2. 1 c.c. of a 1-1000th quinine solution, yields with one drop of ammonia, after addition of :
  - (a) One drop chlorine water : a green turbid mixture.
  - (b) 0.1 c.c. chlorine water : a bright green coloration.
  - (c) 0.5 c.c. of the chlorine reagent : a pale green coloration.
  - (d) 1.0 c.c. chlorine water : a slightly yellow mixture.
3. 0.1 c.c. of a 1-1000th solution, under like conditions, yields with :
  - (a) One drop chlorine water : a very bright green coloration.
  - (b) Two drops of the chlorine reagent : a less intense green coloration.

## C. 1-5000th solution of quinine.

1. 5 c.c. of the solution = (1 mg. quinine) yields with a drop of ammonia, after addition of :
  - (a) One drop chlorine water : a colorless solution, which, after a time, may acquire a greenish hue.
  - (b) 0.2 c.c. chlorine water : a fine, emerald green solution.
  - (c) 0.5 c.c. chlorine water : a well-marked green coloration, quickly discharged on shaking the mixture.

(d) 1.0 c.c. of chlorine reagent: no coloration, but, after a time, the mixture assumes a yellow hue.

2. 1 c.c. of a 1-5000th solution, with one drop of ammonia after adding:

(a) One drop chlorine water: a fine, green coloration, changing to bluish-green.

(b) 0.1 c.c. chlorine water: a pale green coloration.

(c) 0.5 c.c. chlorine reagent: a light green color, quickly changing to a faintly yellow.

3. 0.1 c.c. of 1-5000th solution, with one drop ammonia, after adding:

(a) One drop chlorine water: a well-marked green coloration.

(b) Two drops chlorine water: only a faintly yellowish color.

D. 1-10000th solution of quinine.

1. 5 c.c. of the solution (= 0.5 mg. quinine) yields with one drop of ammonia, after addition of:

(a) One drop chlorine water: the mixture slowly acquires a greenish hue.

(b) Two drops chlorine water: a strongly marked green coloration.

(c) 0.2 c.c. of chlorine water: a colorless mixture.

2. 1 c.c. of a 1-10,000th solution, yields with:

(a) One drop chlorine water and one drop ammonia: a marked green coloration.

(b) Two drops chlorine water and a drop of ammonia: the mixture may present a greenish hue, which quickly changes to yellow.

From 0.1 c.c. of a 1-10000th quinine solution, a greenish coloration may be obtained by employing a drop of a much-diluted solution of chlorine.

From 5 c.c. of a 1-20000th solution of quinine, no green coloration was obtained, even on employing a diluted solution of chlorine.

In 1872, Prof. Flückiger<sup>1</sup> proposed to substitute *bromine* for chlorine in this test, and stated that its reaction was much more

<sup>1</sup>Neues Jahr. f. Pharm., 1872. 139.

delicate than that of chlorine, since under it a green coloration might be obtained from a 1-20000th solution of quinine, whereas, chlorine had its limit in about a 1-5000th solution.

In the following examinations a saturated aqueous solution of bromine was employed, it being prepared by agitating excess of bromine with water, and, after subsidence, decanting the clear, highly colored solution. The reagent should be freshly prepared, since it may, within twenty-four hours, especially if exposed to light, undergo a marked change. A saturated aqueous solution of the reagent contains practically 1 per cent. by volume, or 3 per cent. by weight of bromine.

A. 1-100th solution of quinine.

1. 5 c.c. of the solution yields with :

(a) One drop of bromine water : a copious yellow precipitate which quickly dissolves to a colorless solution, the addition of a drop of ammonia causes a white precipitate (quinine), which, after a time, acquires a bluish hue, then a bluish green color.

(b) Three drops bromine water then one drop ammonia, yield a precipitate which soon assumes a greenish blue color.

(c) 0.5 c.c. bromine water followed by one drop ammonia : the mixture quickly becomes bluish green, which increases its intensity.

(d) 1.0 c.c. bromine water causes a slightly yellow coloration ; the addition of 0.1 c.c. ammonia produces a white precipitate which quickly assumes a bright green color, which may change to purple.

The exact coloration produced in the above solutions depends somewhat upon the manner in which the reagents mix with the quinine solution. The best results are obtained by dropping the reagents into the quinine solution without agitation.

2. 1 c.c. of the quinine solution yields with one drop of ammonia after addition of :

(a) One drop bromine water : a white precipitate which soon assumes a green color.

(b) 0.2 c.c. bromine water : quickly a bright green solution.

(c) 0.5 c.c. bromine water : a purple precipitate, which, after a time, assumes a strong green color.

3. 0.1 c.c. of a 1-100th quinine solution, yields with one drop of bromine water and a drop of ammonia, a white precipitate which quickly assumes a green color.

B. 1-1000th solution of quinine.

1. 5 c.c. of the solution yields with one drop of ammonia, after adding :

(a) One drop bromine water : a white precipitate which soon assumes a bluish-green color.

(b) 0.1 c.c. bromine : an immediate bright green coloration.

(c) 0.3 c.c. bromine water alone causes a yellow coloration, which on addition of the ammonia, is changed to deep purple, and this may slowly change to very dark green.

2. 1 c.c. of the quinine solution with one drop of the bromine water and one drop of ammonia will yield a bright green coloration. Under the action of a slightly larger quantity of the bromine reagent, only a purple color will appear, or the mixture will remain colorless.

3. 0.1 c.c. of the quinine solution with a *minute* drop of the bromine water and one drop of ammonia, will yield a green coloration ; but if a full drop of the bromine reagent be employed, a colorless mixture will result. With a diluted solution of the bromine water (1:4), a fine green coloration may be obtained.

C. 1-5000th solution of quinine.

1. 5 c.c. of the solution with one or two drops of the bromine water and one drop ammonia, yields a good green coloration. With a slightly larger amount of the bromine reagent, the mixture remains colorless.

2. 1 c.c. of the quinine solution with one drop of bromine water and one drop ammonia, will after a time acquire a green coloration. If two drops of the bromine water be employed, the mixture remains permanently colorless.

3. 0.1 c.c. yields with a drop of the bromine reagent, a deep yellow color, which is quickly discharged to a permanently colorless solution by a drop of ammonia. Under the action of a drop of diluted bromine water (1:9), a bright green coloration may be obtained.

## D. 1-10000th solution of quinine.

## 1. 5 c.c. of the solution with :

(a) One drop bromine water yields a colorless solution, which on addition of a drop of ammonia quickly assumes a green color; this becomes deep bright green, which remains unchanged for many hours.

(b) Two drops of bromine water causes a yellow color, which is immediately discharged by a drop of ammonia, and the mixture remains colorless.

2. 1 c.c. of the quinine solution fails to yield a green coloration unless the bromine reagent be diluted.

3. From 0.1 c.c. of the quinine solution, no green coloration was obtained, even with the diluted bromine reagent.

## E. 1-20000th quinine solution.

5 c.c. of this solution yields no green coloration with the undiluted bromine reagent; but under a dilution of 1:2 a well-marked green color may be obtained.

From the foregoing it is obvious that the production of a green color under the action of this test depends upon the presence of the quinine and bromine in proportion contained within rather narrow limits; otherwise the green coloration will not manifest itself. Should it be desired to apply this test to only a small and limited quantity of a suspected solution, it would be necessary, or at least advisable, to first ascertain under what conditions a similar volume of solution of quinine of known strength would give a positive reaction with a given quantity of the bromine reagent, after proper dilution of the latter if necessary.

If an aqueous solution of chlorine, instead of bromine, be employed in the thalleioquin test, a positive reaction will manifest itself through a greater range than when bromine is employed, the result being less readily affected by excess or deficiency of the reagent.

In regard to the production of a *red* coloration, by treating the quinine solution, after addition of bromine or chlorine, and before adding the ammonia, with *potassium ferrocyanide* solution, as advised by Vogel, the results were less satisfactory than the test without the use of the potassium salt. With solutions containing more than 1-1000th of the alkaloid, a green or red or other coloration may be



developed, the result depending upon the relative proportions of the reagents employed.

On treating 5 c.c. of a 1-1000th quinine solution with one drop of bromine water followed by one drop of potassium ferrocyanide solution (1:12) and a drop of ammonia, the result is about the same as without the presence of the potassium salt; that is, a white precipitate soon becoming green is produced. But, if under these conditions 0.2 c.c. of the potassium solution be employed, a portion of the mixture may be red and a portion green in color.

5 c.c. of a 1-5000th solution of the alkaloid under the action of one drop each of the reagents as above, yields a fine green coloration. If, however, to this quantity of the quinine solution one drop of bromine water be added and then 0.5 c.c. of the ferrocyanide solution, the mixture, without the addition of ammonia, immediately assumes a deep red color. If a drop of ammonia be now added, the red color quickly changes to a beautiful purple.

5 c.c. of a 1-10000th quinine solution with one drop each of the reagents, yields a fine red-purple coloration which soon changes to green.

5 c.c. of a 1-20000th solution, under like conditions, yields a fine red coloration, which quickly fades to a light yellow color.

## 2. HERAPATHITE TEST

This test was first proposed by Dr. Herapath, in 1852, and consists in the formation of *quinine iodosulphate* or *Herapathite*, as it has been termed. This compound may be obtained by treating a solution of quinine in a mixture of strong acetic acid and alcohol, with an alcoholic solution of iodine. In a little time the iodosulphate separates out in the form of characteristic plates and rosette groups of crystals. By reflected light, the crystals are of a dark green color; under transmitted light they are dichroic and strongly polarize light.

The reagents may be prepared as follows: (a) Thirty volumes of strong acetic acid are mixed with ten volumes of strong alcohol and one volume of diluted sulphuric acid (1:10). (b) One part of iodine is dissolved in about twenty parts by weight of alcohol.

To apply the test, a drop of the quinine solution is evaporated to dryness, and the residue treated with a drop of the first-mentioned solution; a minute drop, or sufficient to color the liquid brownish-

yellow, of the alcoholic solution of iodine is then added. Very soon portions of the mixture will present a dark green deposit, which when examined by a moderate power (75 diam.) of the microscope will be found to consist of the crystals in question. The formation of these crystals is perfectly characteristic of quinine.

The residue from *one drop* of a 1-100th solution of quinine, in the form of sulphate, when treated with a drop of the acetic acid mixture and then sufficient of the iodine solution to impart a strong color, will yield innumerable crystals of the iodosulphate compound.

A 1-500th solution residue will generally yield an abundant deposit of the crystals.

The residue from a drop of a 1-1000th solution, if simply moistened with the acetic acid liquid and then with a minute drop of the iodine solution, may yield satisfactory results; but it requires a nice adjustment of the reagents to obtain satisfactory results from this quantity of the alkaloid.

### 3. FLUORESCENCE.

One of the most striking properties and at the same time the most delicate reaction of quinine at present known, is the fluorescence of solutions of its oxysalts, especially the sulphate. Normal solutions of the hydrochloride, hydrobromide, hydriodide and hydrocyanide present little or no fluorescence. A solution of the hydrochloride containing a limited excess of hydrochloric acid, may, as pointed out by Prof. R. A. Witthaus,<sup>1</sup> present, a well marked or even strong fluorescence, especially in dilute solutions; but this is permanently destroyed by a slightly larger quantity of the free acid.

When in solution as quinine normal acid sulphate, without excess of acid, and examined by ordinary reflected light in volumes of 50 to 100 c.c. the blue fluorescence is very intense in the 1-100th, 1-1000th, and 1-10000th solutions, and very well marked in a 1-50000th solution; but it is not apparent in a 1-100000th solution, and is only faintly marked even under a cone of condensed sunlight.

If 1 c.c. of the acid sulphate solution, placed in a small test tube, be examined it will present as follows:

(1) 1-100th solution, a very strong blue fluorescence in reflected light, which becomes intense in condensed sunlight.

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<sup>1</sup> Researches Loomis Laboratory, 1892, 91.

(2) 1-1000th solution, a strongly marked fluorescence in reflected light; only feebly marked in direct sunlight; but intense in a cone of sunlight.

(3) 1-10000th solution, a just perceptible fluorescence in reflected light; appears colorless in sunlight; intensely fluorescent in a cone of sunlight.

(4) 1-50000th solution exhibits no marked fluorescence in either reflected or in direct sunlight, and only a faint fluorescence under a cone of sunlight. On the addition of a drop of dilute sulphuric acid, the solution presents a quite well-marked fluorescence in condensed sunlight.

(5) 1-100000th solution in condensed sunlight presents only a faint fluorescence; but on addition of a drop dilute sulphuric acid, the fluorescence is well marked.

The last-mentioned degree of dilution is by no means the limit of the fluorescence of quinine solutions, under certain conditions. Kerne, rby a specially constructed instrument, termed by him the fluorescope, was able to obtain the fluorescence beautifully marked in a solution of the alkaloid under a dilution of two million times.

It should be borne in mind that the fluorescence of quinine solutions, even of the sulphate, may be entirely prevented by the presence of chlorides, bromides and iodides, and the free acids of these salts. If to 1 c.c. of a 1-100th solution of quinine sulphate, which is strongly fluorescent, one drop of hydrochloric acid or of a solution of sodium chloride (1 : 10), be added, the fluorescence is immediately and wholly destroyed, and is not reproduced on the addition of even 0.5 c.c. of dilute sulphuric acid. The interference of bromine and iodine is as prompt and complete as that of chlorine.

According to the recent observations of MM. Sestini and Campani<sup>1</sup> the fluorescence of sulphuric acid solutions of quinine, especially when dilute, may also be concealed by the presence of *phenacetine*. According to these observers, this substance may also greatly interfere with the normal reaction of quinine with both chlorine and bromine in the thalleioquin test.

The property of fluorescence is possessed, although in a less degree, by some of the other cinchona alkaloids; and Dr. Bence Jones, of London, has described a substance normally present in the body, which has a similar property, and named by him *animal quinoidine*.

<sup>1</sup> Jour. Chem. Soc., Abs., May 1892, 665.

Beside these substances, certain vegetable principles and extracts and the hydrocarbon oils present fluorescent properties.

#### 4. TEST OF TASTE.

The intensely bitter taste of quinine and its salts may serve as a test of its presence. Of the ordinary preparations of quinine, the tannate is the least and the free alkaloid next least bitter; the normal sulphate is less bitter than the bisulphate, hydrobromide or hydrochloride.<sup>1</sup>

The taste of the acid sulphate is very distinct and strongly marked in a single drop of a 1-10000th solution; and is still distinct in the same quantity of a 1-20000th solution; but, according to several persons, is not perceived in a drop of a 1-50000th solution.

In the very elaborate investigations of Dr. G. Kerner<sup>2</sup> on the absorption and elimination of quinine, he found that when taken into the stomach in 0.5 gram (7.5 grains) doses, it appeared in the urine in fifteen minutes thereafter; and that one-half of the total quantity taken was thus eliminated in six hours; and one-fourth in the following six hours; but that a trace might still be present in the urine at the end of seventy-eight hours.

Of the quinine thus eliminated Dr. Kerner found that a large portion had undergone a material change, in that while it still possessed fluorescent properties, responded to the reaction with chlorine and ammonia, and with chlorine and potassium ferrocyanide, it no longer had a bitter taste, it now being tasteless. By experiments he found that under the limited oxydation of quinine by potassium permanganate, a substance was produced which was tasteless and corresponded in every respect to this eliminated quinine. On analysis this oxydation product was found to be *dihydroxyl quinine*, having the composition  $C_{20}H_{24}N_2O_2 \cdot 2OH$ . From these results Dr. Kerner concluded that it was under this form that the alkaloid, in part at least, appeared in its tasteless condition in the urine.

If then, in the absorption of quinine or under oxydation, this change to the tasteless variety may take place, it is easy to understand that in the extraction of the alkaloid from the urine or the tissues, this important corroborative test might fail, even when the chemical tests indicated its presence. At present we have little or

<sup>1</sup> Prescott Organic Analysis, p. 127.

<sup>2</sup> Archiv für Physiologie, ii, 1869, pp. 200-243; iii, 1870, 93-165.

no experience in regard to the recovery of quinine from the body, long periods after death.

That the alkaloids in general may undergo a slow and gradual change in the presence of decomposing animal matter seems to be fully established by the investigations of Profs. Buchner, Gorup-Besanez and others<sup>1</sup>, as well as our own observations, in the case of strychnine, which, under the conditions stated, after a time, loses its property of responding to the color and certain other chemical tests, but still retains its bitter taste and the property of producing tetanic convulsions in frogs.

So also, Dr. Pellacani<sup>2</sup> on mixing a definite quantity of *curarine* with a given quantity of fresh blood and allowing the mixture to putrify under favorable conditions of temperature, found after some months that the alkaloid no longer responded to the physiological test, although it still retained its chemical properties, except with the sulphuric acid test.

From our own experience we are strongly led to believe that when morphine and strychnine are taken in moderate toxic quantity, that portion of the alkaloid which is carried to the tissues by the ordinary process of absorption, entirely loses its property of crystallizing, even when present in quantity sufficient to promptly respond to chemical tests.

When the morphine or strychnine is taken in excessive quantity, a portion seems to be distributed to the organs by simple exosmotic diffusion, and this may readily be recovered in the crystalline state. In a case in which 1.68 grams (about 26 grains) of strychnine were administered subcutaneously to a dog during a period of four hours, in divided doses, so as to keep the animal paralyzed, 56 mgs. of well-crystallized strychnine was recovered from the urine, 26 mgs. from the liver, and 14 mgs. from the blood.

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MEDICAL DEPARTMENT.

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<sup>1</sup> *Ann. d' Hyg.*, 1881, 385.

<sup>2</sup> *Rivista Sp r Med. Legal*, xiii, 2, p. 237.

## STRUCTURE OF ASARUM CANADENSE, L. —

BY EDSON S. BASTIN.

This pretty little plant, commonly called Wild Ginger, is not uncommon in the rich woods of the northern United States. It also occurs as far southward, along the Alleghanies, as South Carolina. It is a modest perennial herb, producing rhizomes which creep extensively near the surface of the ground, and which branch repeatedly, giving rise to new plants. Thus, as in the case of *Podophyllum*, the plants are commonly found growing in dense patches. The rhizomes are somewhat quadrangular, marked at intervals of about 12 mm. with prominent, more or less oblique scale scars, and producing on their inferior surface, mostly from the nodes, small clusters of slender, nearly simple rootlets averaging 60 mm. in length. The rhizomes possess an aromatic odor, and besides some bitterness, a pungently aromatic taste, reminding one of ginger, hence the popular name of the plant.

The end of the rhizome rises obliquely to form the very short above-ground stem, and this bears two long-petiolate, exstipulate leaves, whose blades are thin, broadly reniform, entire-margined and slightly but distinctly pointed at the apex. They attain a transverse diameter of from 10 to 12 cm., are deep-green and silky-lustrous by reason of a minute pubescence on the upper surface, and are lighter colored and prominently veiny below.

From between the two leaf-bases issues a single pedunculate, nodding, dull-purple flower, which, together with the peduncle, is densely covered on the outside with a woolly pubescence. The calyx is rather fleshy, with its tube adnate to the ovary, and a three-parted limb the segments of which, in the bud, have their tips inflexed, but which, when the flower is in full bloom are wholly recurved.

The corolla in this as in all other species of the *Aristolochiaceæ* is wanting.

The andrœcium consists of twelve stamens arranged in two whorls of six each, and the members of the outer are somewhat shorter than those of the inner whorl. The stamens are colored like the calyx and each is provided with a short, thickish, outwardly-curved filament and a two-celled, adnate, longitudinally dehiscent, extrorse anther, whose connective is conspicuously prolonged and pointed.

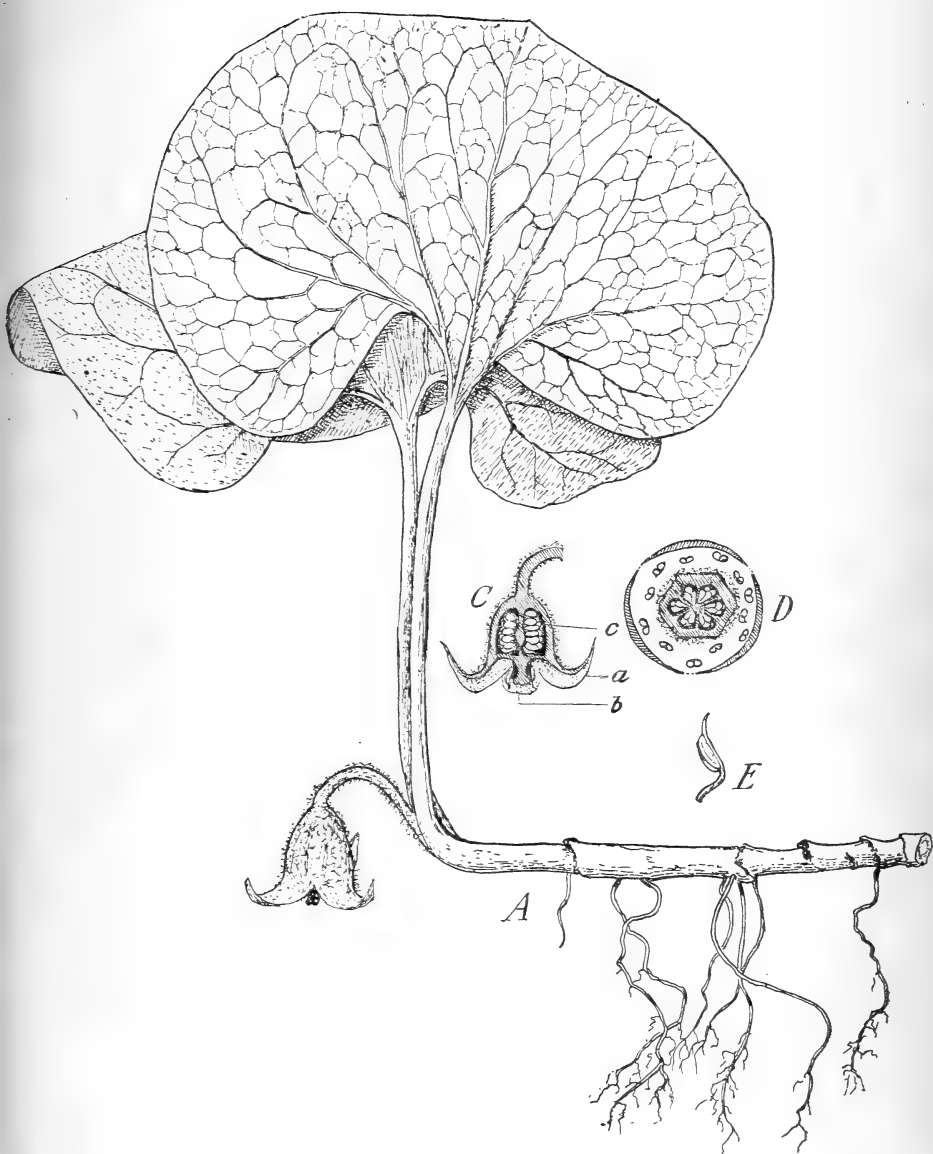


FIG. 1.

The pistil is provided with a short, thick, fleshy style that is crowned with a six-lobed stigma. The ovary is six-celled, with an axillary placentation and numerous anatropous ovules.

The fruit is an irregularly dehiscent, many-seeded capsule.

The seeds are carunculate along the raphe and the embryo is minute, imbedded in a copious albumen.

The rhizomes with the rootlets are the parts employed in medicine. The rhizomes are from 5 to 6 mm. in diameter when fresh,

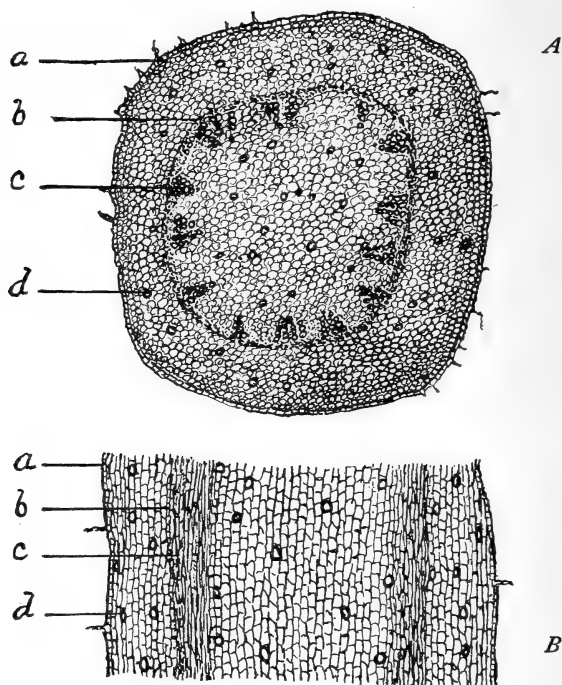


FIG. 2.

from 10 to 20 cm. long, whitish exteriorly and interiorly, but when dried they average considerably thinner, are finely wrinkled, and are brown or purplish-brown externally, and whitish or brownish internally. The fracture is short, the zone of wood rather thin, surrounding a large pith and is composed of from ten to fourteen short, wedge-shaped vasa bundles arranged in a single circle and rather widely separated from each other. The bundles are frequently quite unequal in size and are often set at quite unequal distances in the



circle. The phloem portions of the bundles contain no fibrous elements, and the xylem portions usually no lignified ones except the tracheary tissues, which consist mostly of spiral and scalariform

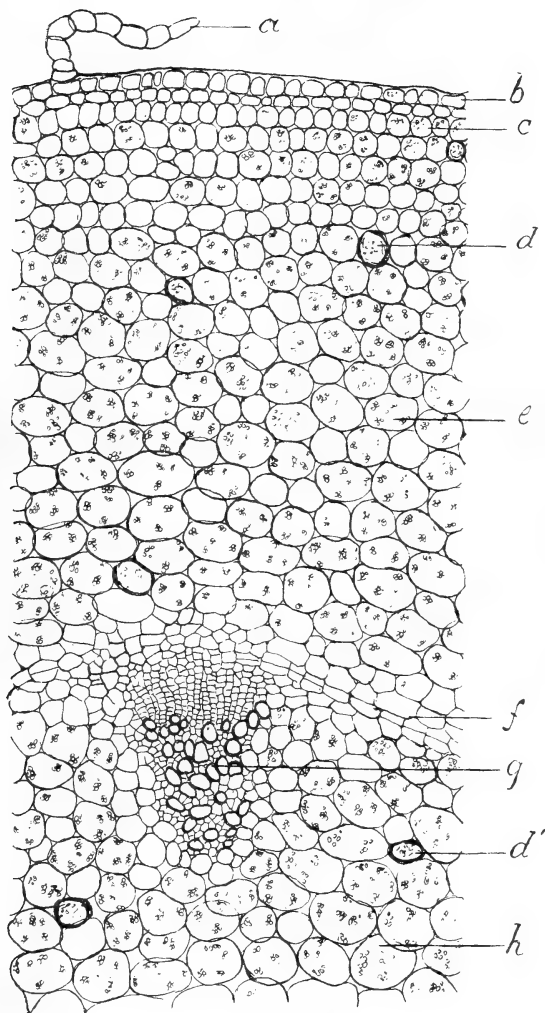


FIG. 3.

ducts and tracheids of small or moderate calibre. The circle of bundles is bounded exteriorly by a zone of parenchymatous cells considerably smaller than those of the cortex exterior to them, con-

stituting a cylinder-sheath, a structure not often seen in the rhizomes of dicotyls.

The epidermis persists even on rhizomes that are quite old, cork not being formed beneath it, as it is in the case of most other rhizomes of dicotyls. Attached to the epidermis are seen scattered,

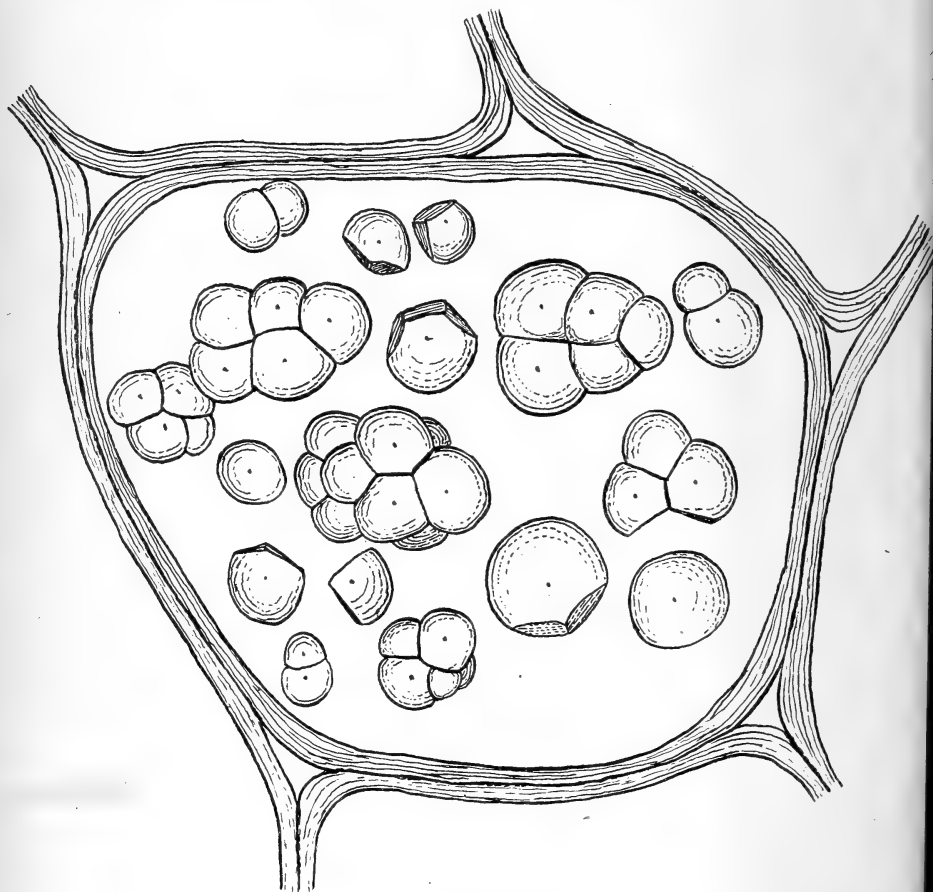


FIG. 4.

simple hairs, each consisting of several elongated cells arranged in linear series. Beneath the epidermis are several layers of collenchyma cells, which in transverse section are usually tangentially elongated. The cells show a tendency to fissure along the thickenings in a tangential direction.

In the thick cortical parenchyma and in the pith occur scattered oil-cells, easily identifiable in the sections after treating them with solution of alcannin. Unless stained, they differ little in appearance from ordinary parenchyma cells, save in the absence of starch.

In the ordinary parenchyma both of the pith and the cortex starch is abundant, though fine-grained. The grains are sometimes simple, but more commonly double, triple, or in masses of from

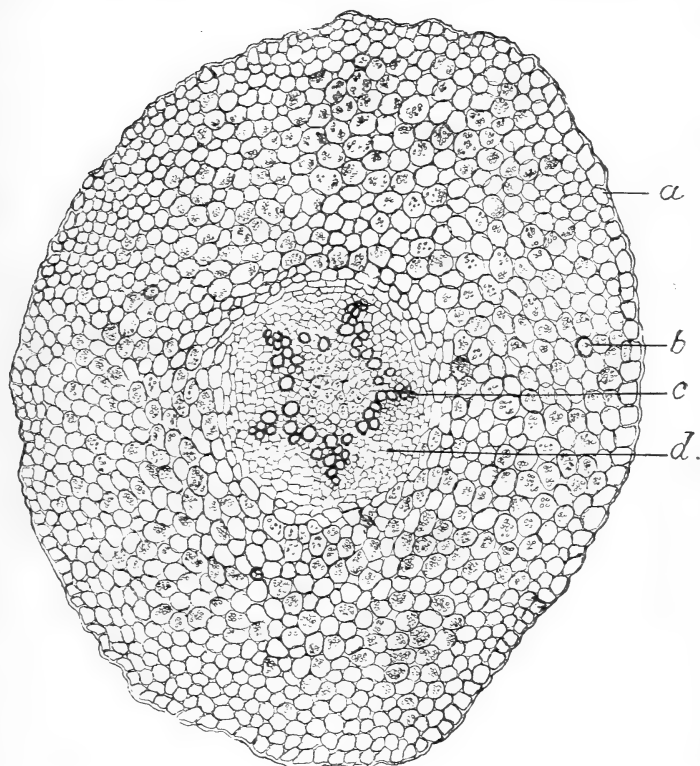


FIG. 5.

three to twelve grains. The hilum, which is sub-central, is inconspicuous and seldom fissured, and the grains show no distinct stratification curves.

The roots, which attain about a millimetre in diameter, have a thick cortical parenchyma, consisting mainly of starch-bearing cells, among which, however, are sprinkled a few oil cells. The central radial bundle, which commonly has a diameter slightly less

than the thickness of the cortex, is usually tetrarch or pentarch, and undergoes few secondary changes. The central part of the bundle usually remains pithy, and its cells contain fine-grained starch.

#### DESCRIPTION OF FIGURES.

*Fig. 1.*—*A*, Flowering plant of *Asarum Canadense*, three-quarters natural size.

*C*, One of the flowers as seen in vertical section. *a*, segment of calyx; *b*, stigma; *c*, ovules.

*D*, Ground plan of the flower.

*E*, One of the stamens.

The above drawings are from the "Laboratory Exercises in Botany."

*Fig. 2.*—*A*, Transverse section of rhizome magnified nine diameters. *a*, epidermis; *b*, cylinder sheath; *c*, vasal bundle; *d*, secretion cell.

*B*, Longitudinal section of rhizome, also magnified nine diameters.

The small letters refer to the same parts as in *A*.

*Fig. 3.*—Part of cross-section of rhizome magnified seventy-five diameters. *a*, hair on epidermis; *b*, epidermal cell; *c*, collenchyma; *d*, *d'* secretion cells; *e*, cortical parenchyma cell; *f*, cylinder sheath; *g*, vasal bundle; *h*, pith parenchyma cell.

*Fig. 4.*—One of the cortical parenchyma cells, containing starch, magnified 1,200 diameters.

*Fig. 5.*—Transverse section of one of the roots, magnified seventy-five diameters, showing a pentarch bundle in the central cylinder. *a*, epidermis; *b*, secretion cell; *c*, one of the xylem rays; *d*, one of the phloem masses.

### RUBUS VILLOSUS.

BY HERMAN HARMS, PH.G.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. No. 137.

For a complete analysis of blackberry bark, the reader is referred to an inaugural essay by G. A. Krauss, in the *AMERICAN JOURNAL OF PHARMACY* for 1889, page 605; and for further investigation of the glucosidal principle to a paper by the same author, in this *JOURNAL*, for 1890, page 161.

It was with a view of examining this last substance, as also the tannin of the drug, that the present work was undertaken.

For the former purpose, 1,500 grams of coarsely-powdered bark were exhausted with alcohol, sp. gr., .820, the percolate concentrated under reduced pressure, diluted with water, and treated with

freshly precipitated ferric hydrate, until no reaction for tannin could be obtained in the filtered liquid. The detannated filtrate so obtained was concentrated under diminished pressure and divided into two portions.

One of these evaporated under the above conditions to dryness, yielded a residue of a reddish-brown color.

This was treated, first with boiling alcohol, sp. gr. .794, which extracted a brownish-red, bitter substance, and then with ether, sp. gr. .725, which upon evaporation left a yellow, inodorous, acrid and amorphous body. The last-named product gave at once with sulphuric acid a deep-brown color, which the addition of water changed to greenish and finally to black. The same effect was produced by potassium bichromate and sulphuric acid. No change was caused by nitric acid nor by ferric chloride.

The brownish-red, bitter substance extracted by the boiling alcohol above, was dissolved in acidulated water and the solution so obtained repeatedly shaken with chloroform, which removed a white substance, the following reactions of which gave evidence of the presence of saponin.

With hot sulphuric acid a reddish-brown color was produced.

A solution of the material in water, which readily dissolved it, possessed a marked tendency to froth, and gave an abundant white precipitate with basic lead acetate and with saturated solution of barium hydrate.

A solution of the principle in two per cent. hydrochloric acid when boiled for several hours yielded a blackish precipitate and a reddish-brown liquid, which was filtered and agitated with ether and chloroform in succession.

The residues left upon the evaporation of these solvents, failed to comply with the tests for saponin given above, thus indicating the decomposition of the original substance.

The remaining portion of the detannated and concentrated liquid was shaken with ether, sp. gr. .725. This solvent left upon evaporation a yellowish-white residue, which, as shown by the following reactions, corresponded in all respects to the *villosin* of Krauss.

Heated on platinum foil, it melted, burned with a yellowish flame and was completely consumed.

It was soluble in methyl and ethyl alcohol, sparingly in water and ether, sp. gr. .725, and insoluble in chloroform.

It was slowly dissolved by solutions of the alkali hydrates with the production of a yellow color.

An aqueous solution of lead acetate produced no change in a water solution of the substance, but an alcoholic solution of this reagent and also basic lead acetate gave white precipitates with the same liquid.

Sulphuric acid in contact with the residue developed a brownish color, which changed on the addition of one or two drops of water, and the application of gentle heat, into violet and deep blue.

Sulphuric acid and a drop of nitric acid caused an orange-red color, destroyed by heat as well as by the addition of a few drops of water.

The aqueous solution, from which this principle had been removed by means of ether, was evaporated under reduced pressure to dryness. The residue was dissolved in water containing one per cent. of hydrochloric acid, and the solution so obtained boiled for several hours with the production of a reddish-brown precipitate. This was collected, dissolved in alcohol, and the solution, after filtration, allowed to evaporate spontaneously whereby a brownish crystalline mass was procured. To prepare a larger quantity of this product, the experiment was repeated with six kilos of bark which were exhausted with alcohol, sp. gr. .820.

The percolate was concentrated and detannated as above, then mixed with sufficient hydrochloric acid to produce a solution containing one per cent. of absolute gas. This solution was boiled for several hours, the precipitate formed was collected, and the filtrate after concentration allowed to evaporate spontaneously over sulphuric acid whereby a brownish residue was obtained.

The precipitate produced by the action of hydrochloric acid was treated with alcohol, sp. gr. .848.

The brownish residue left upon the spontaneous evaporation of that solvent when purified by repeated solution, filtration, and treatment with animal charcoal was finally acquired as a yellowish-brown, indistinctly crystalline mass.

This was treated with ether, which dissolved a portion, and left undissolved a residue that retained the original color. The ethereal solution was set aside to evaporate. The following properties of the insoluble part of the crystalline mass were noted: Insolubility in ether and chloroform; sparing solubility in cold and hot water;

greater solubility in alcohol, sp. gr. .820, and in hot alkali hydrate solutions, with the development of yellow color. When heated to 265° no signs of melting, but a distinct charring, was noticed. It burned with a bright, yellowish flame and left no residue. Its aqueous and alcoholic solutions were precipitated by both normal and basic lead acetate.

Fehling's solution was slightly reduced, and silver nitrate suffered a slow reduction. With one drop each of sulphuric acid and water, the substance produced a brownish solution, which turned to dark-violet when warmed, and finally to a deep-blue color. Sulphuric and nitric acids gave an orange-red color, which was destroyed by heat and the addition of water.

This substance was evidently the decomposition product of *villosin*, termed by Krauss *villosic acid*.

Upon the evaporation of the ether, with which the crystalline mass was treated, an inodorous, acrid and bitter substance of a yellow color was obtained. An attempt was made to crystallize it from alcohol, sp. gr. .794, but it separated as an amorphous, resinous body, insoluble in water, sparingly soluble in hot alkaline solutions, but easily soluble in alcohol, ether and chloroform. An alcoholic solution of it, when poured into water, produced a white precipitate. The same solution was not affected by ferric chloride, sodium hydrate nor an alcoholic solution of lead acetate. The substance did not reduce Fehling's solution. Upon the application of heat, it melted, burned and left no ash. A mixture of sulphuric and nitric acids dissolved it without color.

One drop of sulphuric acid and two drops of water produced, when slightly warmed, a purplish color, which changed to brownish-black.

The filtrate from the crude product of the action of boiling hydrochloric acid, as mentioned before, was concentrated and then allowed to evaporate spontaneously over sulphuric acid, whereby a brownish residue was obtained. This was dissolved in boiling alcohol, sp. gr. .820, treated with animal charcoal and the filtrate after concentration set aside. The amorphous residue that was left upon the vaporization of the solvent was completely soluble in water, and with Fehling's solution gave abundant evidence of the presence of glucose.

The results of the above experiments lead the author to consider the glucosidal principle termed *villosin* as one of the saponins.

## TANNIN OF RUBUS VILLOSUS.

*Estimation.*—That a knowledge might be gained of the relative value of the bark sold in the market and that freshly gathered, the writer made collections of the drug in the vicinity of Philadelphia, on November 24, 1892, January 2, 1893, and February 2, 1893. The three samples which he obtained were numbered, respectively, three, four and five, were taken from medium-sized roots, and were carefully deprived of earth and of the woody portion which is frequently found in commercial bark. Samples one and two were representative of the market article.

The tannin was estimated by the gelatin and alum method.

Somewhat higher results were obtained from samples three and four by the "hide" process.

For comparison, the tannin, moisture and ash of the fresh bark, and also the amount of tannin in the thoroughly dried drug, are given in the subjoined table in percentages :

Sample.	Ash.	Moisture.	Tannin in moist drug.	Tannin in absolutely dry drug.
I	3.68	9.86	13.46	14.93
II	4.53	8.78	10.84	11.89
III	4.56	45.15	10.37	18.91
IV	3.87	38.44	10.72	17.42
V	4.31	9.22	12.74	14.03

*Preparation and Purification.*—Twelve hundred grams of sample No. II were macerated with water for twenty-four hours, and then percolated with the same solvent until six litres of liquid were obtained.

Several methods for the separation and purification of the tannin of the percolate were then tried.

A portion of the liquid was agitated with acetic ether, but this solvent removed only a small amount of a yellowish substance. The entire percolate was then completely precipitated with lead acetate.

The precipitate was collected on a filter, allowed to drain, and was then decomposed by hydrogen sulphide. The lead sulphide was separated ; the liquid boiled to remove hydrogen sulphide, and then filtered.

One-sixth of this filtrate, representing one litre of the original



percolate, was shaken with acetic ether, which, as before, extracted only a very small amount of tannin.

Acetic ether is used for the extraction of most tannins from their aqueous solutions, and on account of the small yield in the above experiment, the watery liquid was tested for tannin with ferric chloride, lead acetate and gelatin, all of which gave abundant precipitates, thus confirming the presence of this principle, and demonstrating the insolubility of the latter in acetic ether, when applied to the aqueous solution.

When this evidence of the inefficacy of acetic ether was established, the whole amount of the tannin-containing liquid was manipulated as follows: The solution was divided into two equal portions, one of these was exactly precipitated with lead acetate, the lead compound collected on a filter, thoroughly drained, then stirred into the retained portion, and the mixture filtered.

The much lighter-colored liquid so obtained was concentrated under reduced pressure to about one-fourth its volume and again filtered. After agitation with successive portions of ether, it was further concentrated, refiltered, and distilled under the above conditions to dryness.

The residue had a brownish-yellow color and was but sparingly soluble in ether, alcohol or acetone. To separate any remaining traces of lead, the residue was treated with distilled water, which readily effected solution of the greater part, the aqueous solution filtered, saturated with hydrogen sulphide, refiltered and distilled to dryness under diminished pressure.

Again, as before, the tannin was obtained as a hard, resinous residue.

As it is customary to recognize the purity of a tannin to a certain extent by obtaining it in a porous or "puffed up" condition, frequent attempts were made to procure this one in that form by dissolving the material in ether, alcohol and acetone alone, and in mixtures of alcohol and acetone, and rapidly distilling off the solvents in a vacuum apparatus; but all efforts to this end were futile.

The substance was then powdered and dissolved in a small quantity of distilled water. This solution was mixed with five times its volume of alcohol, sp. gr. .794, which produced a copious precipitate of a yellowish mucilage, which was readily soluble in water and precipitable by both neutral and basic lead acetate, but not by gela-

tin and alum. After standing for forty-eight hours, the mucilage was filtered off and the filtrate evaporated under reduced pressure to dryness. Again attempts were made to "puff up" the tannin, but without success.

Obtained by this means, the tannin was of a dark-brownish color, had a faint odor, was readily soluble in water and in alkaline solutions, with the production of a deep reddish-brown color in the latter instance, and was sparingly soluble in ether, sp. gr. .750 and acetic ether and insoluble in acetone and benzol.

A one per cent. aqueous solution of the tannin reacted as follows :

Boiled with an equal volume of sulphuric acid (1-9), after twenty-four hours standing, a slight brownish precipitate.

Bromine water, yellow precipitate.

Ferric chloride, dark-greenish color ;  
and

Ammonium hydrate, red-brown color.

Tartar emetic, no change ;  
and

Ammonium chloride, faint clouding ; after twenty-four hours standing, a reddish-brown precipitate.

Copper sulphate, deep-brown precipitate with a greenish-yellow supernatant liquid ;  
and

Ammonium hydrate, greenish-brown color.

Lead nitrate, brownish-yellow precipitate.

Calcium hydrate, darkening of color ; after standing, a dirty yellowish solution with a greenish fluorescence.

Cobalt acetate, grayish-brown precipitate.

Manganese acetate, cloudiness ; on standing, a slight reddish precipitate.

Uranium acetate, brownish precipitate.

Ammoniacal picric acid solution, dirty-brownish precipitate ; changing, on standing, to a grayish-green.

Potassium bichromate, deep-brown color.

Silver nitrate, reduced.

Ferric acetate, red-brown precipitate.

Gelatin and alum, precipitate.

Fehling's solution, reduced.

Some of the preceding tests resemble those given by the tannin of hemlock, while others, those obtained from cutch tannin, as tabulated in Allen's Commercial Organic Analysis, Volume III, Part I, pages 102-103.

The ether with which the aqueous solution of the tannin was shaken, previous to its evaporation to dryness, extracted from that

liquid a yellowish crystalline substance which was shown by the following tests to be, most likely, gallic acid :

Potassium cyanide, bright-red color.

Aqueous solution of picric acid followed by ammonia, deep-brownish color.

Ammonio-silver nitrate, immediate reduction.

Lead acetate, yellowish-white precipitate.

Ferric chloride, greenish-black color.

Ferrous sulphate, no change ; but on exposure, gradually acquired a bluish color.

*Action of Heat*—0.3 gram of tannin was heated with 5 c.c. of glycerin at 160° C., for twenty minutes, and then raised to 200° C., after which it was allowed to cool. The mixture was repeatedly shaken with stronger ether, which, on evaporation, left a yellowish-brown, crystalline residue. An aqueous solution of the latter gave the following reactions :

Calcium hydrate, reddish-brown ppt., soluble in excess of reagent.

Ferric chloride, deepening of color.

Ferric acetate, grayish-brown ppt., with greenish fluorescence.

Fehling's solution, reduced.

Ammoniacal picric acid solution, deepening of color.

Lead nitrate, faint cloudiness.

Lead acetate, faint cloudiness.

Tartar emetic, faint cloudiness.

Ferrous sulphate, no change at first, but solution gradually acquired a bluish color, which was lost upon standing.

With some differences, the above tests correspond to those for pyrogallol.

*Action of Acids (Hydrolysis)*.—0.5 gram of the tannin was dissolved in 100 c.c. of two per cent. (absolute gas) hydrochloric acid, and this solution boiled under an upright condenser for three hours. The solution was allowed to stand for twenty-four hours, and then filtered, to remove the blackish precipitate produced by the action of the acid. This substance was insoluble in both cold and hot water, but readily soluble in alcohol, and in alkali hydrate solutions, with a deep-brown color.

The alcoholic solution was not precipitated on pouring it into an excess of water.

The reddish-brown filtrate was shaken with successive portions of ether, sp. gr. .725, which were mixed and set aside to evaporate. A yellow, crystalline residue, which contained gallic, and probably ellagic acids, was obtained. The aqueous solution was warmed to

expel ether, and then treated with sodium acetate to neutralize the free hydrochloric acid. The liquid now contained free acetic acid, and was precipitated with lead acetate in slight excess. The mixture was filtered, and the filtrate saturated with hydrogen sulphide to remove lead.

After another filtration, the liquid was boiled to expel the excess of the gas, cooled, made alkaline with sodium hydrate, and heated with Fehling's solution for twenty minutes. An abundant precipitate of cuprous oxide was obtained.

*Action of Alkali.*—0.5 gram of the substance was heated with fused potassium hydrate for ten minutes. A strong, peculiar odor, resembling that of burning bread, was emitted during the fusion.

The fused mass was allowed to cool, then dissolved in water, and after the solution had been first acidified with diluted sulphuric acid, and then carefully neutralized with sodium acid carbonate, it was shaken with ether, sp. gr. 725, which left, upon evaporation, a residue.

Tests applied to this residue failed to indicate the presence of gallic acid, protocatechuic acid or phloroglucol.

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## NOTES ON LITHIUM.<sup>1</sup>

BY ENNO SANDER, PH.D.

For a score of years after its discovery by Arfvedson, lithium received but little attention. Berzelius gave it a bare mention in 1824, and it is merely alluded to by others, who found it in the waters of various springs in Bohemia and elsewhere. In 1841, Lipowitz published a paper in the *Annales de Chimie et de Pharmacie*, in which he reviewed the combinations of lithium with various acids, and dwelt particularly upon its marked affinity for uric acid, with which it forms an acid salt, "the most soluble of all the urates, being soluble in sixty parts of water at 122 degrees F., and not separating therefrom on cooling." Dr. Alexander Ure, in 1843, refers to it as a remarkable solvent of sodium urate, but his use of the substance in practical therapeutics was rendered impossible by its scarcity and high price, and it was not until 1858 that it again attracted any attention in therapeutics. About that year Sir A. B. Garrod writes that he "commenced the administration of lithium

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<sup>1</sup> The Journal of the American Medical Association, 23, 638.

salts as an internal remedy, both in cases of uric acid diathesis connected with gravel, and likewise in chronic gout, and was much gratified at the results." But he subsequently adds, "the great bar to the free use of lithium salts in medicine has been their expense."<sup>1</sup>

The price of the remedy, however, does not seem to have deterred Garrod from its continued use, since we find him, in the treatise referred to, devoting a very considerable space to a review of the important therapeutic results personally obtained by him from the use of the salts of lithium, and their undeniable superiority over any other alkaline salts whatever, for both internal and external exhibition. An indorsement so unqualified, coming from such high authority, as a matter of course, at once attracted the attention of the medical world to the remedy, and gave an immense impetus to experimental investigation with lithium salts in therapeutics. It is seldom, however, that the individuality of an investigator or observer is sufficiently pronounced to carry universal conviction of the truth of his observations or conclusions, especially in researches of this description; and here we find the medical profession at once divided as to the correctness and value of Garrod's conclusions. A controversy was inaugurated, on both sides of which talent and learning were enlisted, and which has brought about a very decided advance in knowledge of the behavior of the alkalies in general, and especially towards uric acid. We need not dwell on the merits of this discussion, but pass to more modern matters.

The behavior of lithium carbonate toward uric acid, and its influence upon the solubility of the urates in the human economy, have, in many instances, without doubt, been greatly exaggerated, a fact due mainly to the lively imagination of owners of certain mineral springs, who herald their waters not merely in the daily press, but in medical and trade journals, through advertisements, in which, to quote Dr. A. C. Peale: "The fact that the water contains lithia, if only a trace, is made prominent by the incorporation of 'lithia' into the name or designation of the spring."

Louis Siebold rose against these unwarrantable exaggerations and usurpations in a paper on "Medical and Chemical Misconceptions about Lithia," read before the British Pharmaceutical Confer-

<sup>1</sup> Treatise on gout and rheumatic gout, by Sir A. B. Garrod; first edition, 1860; third edition, 1877; pp. 368-69.

ence in 1889, the substance of which is that the lithium compounds "owe their place in the materia medica originally to the observation that, as compared with potash or soda, a smaller amount of lithia suffices to form a soluble salt with uric acid, and that this salt is more readily soluble in water than the corresponding potassium and sodium salts. From a chemical point of view, its greater antacid or neutralizing power presents itself as owing to its low atomic weight." "It follows from the atomic weight of lithium and potassium that 74 parts of lithium carbonate possess the same acid-saturating power and are likely to dissolve as much uric acid as 138 parts of potassium carbonate." This saturating power, however, is confined only to the carbonate and indirectly to the citrate (which becomes converted into the carbonate within the organism); but "it is extended to a number of mineral waters containing lithia, generally mere traces of it, notwithstanding the fact that what there is of lithium in these waters generally occurs there as chloride or sulphate, salts which neither directly nor indirectly act as alkalies and possess no solvent action on uric acid."

While such rational arguments are convincing to all reasoning men who, in fact, never entertained a different opinion to that expressed by Siebold, they are eminently dissatisfactory to those who prate of "God-given," "Heaven-endowed" fountains of health, "medicines wrought in the laboratory of Nature," and who are ready to apotheosize lithium and place it in the firmament alongside of Hygeia, or with the benign goddess of Greek mythology who hovered over mineral springs and endowed them with healing virtues. This idea seems still to be a favorite one with some mineral-spring proprietors, whose cards and advertisements display conspicuously the winged female with scanty drapery and small regard for the proprieties.

The occurrence of lithium in natural waters is necessarily limited, not merely on account of the limited amount in which it is found, but more especially on account of its existence *always in combination with the most insoluble constituents of the primordial rocks*. One need not, therefore, be surprised at finding that the average content of the lithium salts in mineral springs is not more than four parts in 100,000 of water, or say one grain in three and one-quarter pints.

"Despite the long list of 'lithia springs,' whose advertisements

we find in the medical and secular journals of the day, the actual number of those containing upward of four grains of lithium bicarbonate (equal to about two and five-tenths grains of the dry carbonate) to the gallon, is but fifteen," and this amount has been reduced by more recent analyses in which more accurate methods for the estimation of lithium were followed.

The physiologic investigations of the last decade into the nature of uric acid, and the importance of the rôle played by it in the human economy, have maintained and even intensified the interest in the therapeutic value of the behavior of the salts of lithium towards this acid, first introduced by Garrod and sustained by his successors. The opposition to the views of Garrod, which sprung up years ago, culminated two years since in an elaborate work by Dr. Alexander Haig ("On Uric Acid," 1892), who undertook to prove experimentally on his own person that lithium, administered for the elimination of uric acid from the system, not only failed to accomplish the purpose, but "diminished the excretion of uric acid." In defense of this position he quotes from Rose to the effect that lithium forms "insoluble compounds with phosphate of soda and triple phosphate of ammonia and soda, salts generally present in animal fluids." The work of Rose has not been accessible to me, and I, therefore, am not in a position to assert whether or not Haig properly quoted or understood him, but I find that Dr. Halberstadt asserts that "sodium phosphate causes, in *not too attenuated* solutions of lithium salts, a crystalline precipitate of normal lithium phosphate;" and Sir Dyce Duckworth states that "the normal and biurate of lithium easily dissolve in alkaline fluids, also in phosphate of sodium."

This is in accordance with my own experience, but I found also by actual experiment that no precipitation took place, even after several days, when such solutions are further diluted to one part in 250 or more parts of water before being mixed. When we take into consideration the minute amounts of sodium phosphate and lithium salts that can possibly meet in the blood-serum at any given moment, and that each meeting must occur in rapid motion, we must conclude that other causes have been instrumental in producing the results of Dr. Haig's experiments.

Another protest against the conclusions of Haig was recently published by a well-known French pharmacist, M. P. Ardoue, in

*L'Union Pharmaceutique* (quoted in the *National Druggist*, Vol. xxi, p. 162), who records a case of gouty rheumatism, in which he had examined the urine of the patient before, during and after treatment, and determined a very decidedly favorable action of lithium salt in the excretion of uric acid.

The four experiments of Gorsky ought to be mentioned also, which he carried out in the year 1889, at the laboratory of Loersch at St. Petersburg, on healthy men, each lasting twenty-four days, and by which he arrived at the conclusion that "carbonate of lithia administered in gradually ascending doses, from two to eight grains a day with an effervescent water, increased the daily amount of urine and with it the daily amount of the excretion of uric acid;" and he continues, "it is very probable that lithia favors the transformation of uric acid into urea, and, hence, by freeing the system from the acid, promotes a more energetic cellular action." It would, therefore, seem that the usefulness of lithium salts as a therapeutic agent had not yet outlived itself; but, on the contrary, that the salts will long continue to be employed as a great alleviator of human suffering.

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## CENTRAL (AXIAL) ILLUMINATION. —

BY HANS M. WILDER.

It will probably surprise the average microscopist to learn that he very likely never has used strictly central light. One should think that by keeping the mirror-bar accurately in line with the body-tube, and having the field evenly lighted, the illumination must necessarily be central. It is so after a fashion, but in most cases the illumination is as much as 5 to 10 degrees out of centre.

S. Gage, in his admirable "Microscopical Methods," recommends to beat thin mucilage until milky, transfer a little to the slide, and put on a cover-glass, without pressing it down. Search the preparation until an air bubble is found of an apparent diameter of one Mm., get it in the centre of the field, and apply the plane mirror. If central, the bright spot will be found exactly in the centre of a dark circular ring; if not, then adjust the mirror until it is.

I think that the following method will be found easier of execution: Whatever the object under the microscope, select a spot in the



centre, and move the fine adjustment screw back and forth. If the illumination is central, then the image will disappear and reappear in a vertical direction, while, when out of axis, the image will "wobble" either to the right or left. Adjust the mirror and the relative position of the source of illumination (if feasible), until the image moves vertically. This method presupposes that the micrometer screw works true. In order to find out whether this be the case, combine both methods: Make the illumination central by the first method, and then see whether the image wobbles on focussing up and down; it should, of course, not do so.

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## REPORT ON GINGER CROPS IN JAMAICA.<sup>1</sup> —

BY WILLIAM FAWCETT,  
Director of the Botanical Department.

The quality of commercial ginger upon which the price depends is due chiefly to soil, but also to curing, to the variety, white or blue, and to whether it has been freshly planted a few months before or has been "ratooning"<sup>2</sup> for one or more years.

The soil which produces the very highest quality, realizing perhaps £10 per cwt. in London market, is the very deep black soil of the virgin forest.

Magnificent trees, six feet in diameter, may be seen in some districts lying rotting on the ground, while the ginger cultivators have gone further to the centre of the island, abandoning the woodlands already cut down. The plan adopted in cleaning the forest is, for a cultivator to invite 10 to 12 of his friends to a "cutting match;" he provides food and drink, and the laborious work of felling trees is carried on merrily and without much expense. Afterwards fire is put, and the place is burnt over. This burning is considered very important, as much so as the virgin soil. Probably its importance is due principally to the deposit of potash and other mineral matters contained in the ashes, but the fire will also sweeten the ground, correcting sourness, and moreover it destroys insect pests. Some cultivators will only grow ginger in freshly-cleared woodland and next year they move on to a new clearing, but although in this way

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<sup>1</sup> From Bulletin of the Botanical Department, Jamaica. Vol. I. Part 6.

<sup>2</sup> Ratoon ginger is that which has grown on the same ground for two or more years.

they get very fine ginger, it is at the expense of forest land which would require a very heavy outlay and perhaps a term of a hundred years to restore. Albert Town was not so long ago a centre for the cultivation, but I was told there that growers had already got as far as fourteen miles further inland.

Ginger can be and is grown in many places year after year on the same ground. An intelligent cultivator at Borobridge stated that he knew of ginger growing for forty years in the same patch.

Seaford Town is a German colony, and one of the original colonists, Somers, an active old man of 86 years of age, has been cultivating ginger and arrowroot there since his youth; he and the other colonists have been in the habit of planting a small patch one year, leaving it to ratoon as long as it was profitable, then throwing it up or growing other plants until after a term of years they again plant the same patch with ginger. This is an irregular rotation of crops. "Plant ginger," the produce of planting, is of better quality than the ratoons, and the ratoons in each succeeding year are inferior. When the ground is too poor to grow "white ginger" then "blue ginger," the inferior variety, can be grown.

More depends upon the curing of ginger, considering the raising of the crop as a means of making a livelihood, than soil. At Seaford Town there was a wet season about two years ago, the people could not dry the ginger in the sun, it mildewed, there was consequently very little sale, and the cultivators suffered some distress. I believe from what I saw that, as a rule, careful attention is given to the curing, and that the badly cured ginger brought sometimes to market is due to wet weather rather than to want of care.

It is difficult to make any recommendations on the subject, but the following hints may indicate what points are worthy of consideration by the cultivators. The first is the application of manure. There is a prejudice against its use, some maintaining that it breeds worms, and there is a difficulty also in getting it in any quantity. It is probable that those who have not succeeded with manure have used it improperly by applying it fresh or not sufficiently mixed with soil. As to obtaining it in quantity, example should be taken from the Chinese laborer who preserves every particle of matter that can in any way be utilized as manure, not only cattle manure, but decaying matter of any kind, night-soil, etc., even soapy water left after washing is most useful. To imitate the formation of forest

soil, a pit might be filled with alternate layers of bush and manure everything in the nature of manure or decaying matter should be thrown in, and a layer of soil directly over the manure would be useful. The pit ought to be lined with clay to prevent the very valuable part of the liquid of the manure from escaping, and a cover of some kind, *e. g.*, a sheet of corrugated iron, should be fixed in some way over the pit to keep out rains. I noticed several head of cattle in the Seaford Town district, and apparently the manure is lost, because the cattle wander about in search of food. Possibly grass or clover might be grown in old ginger grounds, and the cattle tethered so as to confine them in one place and the manure easily collected.

To facilitate curing and even sometimes to save the crop, the chief storekeeper in a district, who buys the ginger, might find it advantageous to himself and the people to invest in an American evaporator and dry the ginger artificially.

Possibly the Government could take steps through the Surveyor-General to prevent the forests from being ruthlessly destroyed.

The export of ginger is, on the whole, on the increase, as seen from the following table, but if this is accompanied by the gradual destruction of woods and forests it is not a subject for congratulation.

Year.	Cwt.	Value.
1887 . . . . .	9,927	£17,789
1888 . . . . .	10,222	19,463
1889 . . . . .	8,952	18,615
1890 (one half year) . . . . .	4,948	11,133
1891 . . . . .	10,885	24,493
1892 . . . . .	16,272	40,681
1893 . . . . .	13,632	27,264
1894 . . . . .	14,932	44,796

### A DANGEROUS EXPERIMENT.

An explosion occurred in a drug store in this city recently, resulting in an injury which came near to the destruction of the eyesight of the person injured.

A druggist was experimenting on the action of ammonia water with oxide of silver, and had left the mixture in a porcelain capsule covered with water and a glass stirring rod in the capsule.

A salesman coming into the store thoughtlessly took up the rod and without agitation was replacing it in the capsule when a violent explosion occurred, shattering the capsule, pieces of which

struck him in the face, causing damage which it was feared would result in the loss of one or of both eyes. Prompt and skilful treatment, however, warded off the threatening mischief, and no permanent injury resulted.

The product obtained by the action of ammonia on silver oxide, known as "Berthollet's Vulminating Silver," is a dangerous article. When dry it explodes violently on the slightest percussion, or even when touched with a feather. The black crystals having a metallic lustre decompose violently with detonation when the liquid containing them is shaken.

The exact composition of the compound has not yet been ascertained.

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### IRISH MOSS.

BY THOMAS S. WIEGAND.

A little town, known as Jericho, in Massachusetts, seems to be the centre of this industry. We gather these notes from a paper which was printed lately in the *Boston Herald*.

Boys, men and women all engage in the work, which consists in spreading it upon the beach prepared by raking all the dirt, stones and driftwood away, and leaving a fine bed of white sand; when the weed is first brought in by the boats, each of which gets about a barrel and a half, it is taken upon creels, a sort of barrow, and spread out upon the beach; it is turned over daily as in hay-making, for the space of two weeks; each morning it is washed in clean seawater (fresh water ruins it); it is then gradually bleached, as when first gathered it is of a light-green color, and in the course of a few weeks becomes successively red, pink, and finally nearly white.

Stormy weather is a great drawback to the mosser's work. Some of the moss that the storms tear loose and scatter upon the rocks is gathered and classed as hand-picked, bringing generally a quarter or one half cent per pound more than that gathered in the usual way for commerce.

Should a spell of rainy weather come on during the season of gathering, heavy unbleached muslin covers are used to protect the moss, which is packed up in heaps.

Two crops are obtained each year, the first one being the better; the late crop is liable to be injured by a little black vegetable growth called glut, caused, it is said, by the warmer water of August days.

## EDITORIAL.

### AMERICAN PHARMACEUTICAL ASSOCIATION.

The *Section on Scientific Papers*, through its chairman, has issued a circular letter in reference to the OBSERVATION SHEET proposed by President E. L. Patch, at the Asheville meeting.

The purpose of this sheet is to assist pharmacists in collecting and tabulating a series of data upon incompatibilities, difficult problems and experiences of all kinds in compounding and dispensing drugs, and how they were solved; upon the relative salability and therapeutic value of the various new remedies; upon the condition of the various products purchased by the pharmacist, his experience with the formulas of the Pharmacopœia, National Formulary, etc., as well as errors or difficulties of any kind found in the Pharmacopœia, Dispensatories, or elsewhere.

The sheet is printed on four pages, with space to write down answers under the following:

THE PRESCRIPTION.

THE STORE.

THE LABORATORY.—A. Unsatisfactory products.

THE LABORATORY.—B. Errors in formulas.

There is something new and practical in offering pharmacists this method of recording their experiences, and we hope to hear a valuable report on the subject at the next meeting of the Association. Copies of the Observation Sheet may be obtained by addressing Dr. A. R. L. Dohme, Chairman of the Section, 303 West Pratt Street, Baltimore, Md.

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Professor Dr. G. Dragendorff will sever his connection with the University of Dorpat, Russia, in December, and will, for a time at least, reside in Rostock, Mecklenburg, Germany.

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The Oklahoma Pharmaceutical Association met in El Reno, Okla., October 9, 1894. W. S. Mayfield, of Norman, Okla., was chosen President, and Edwin De Barr, Secretary. The next meeting will be held in Perry, Okla., in July or August, 1895.

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It may be of interest to readers of the AMERICAN JOURNAL OF PHARMACY to learn that the number of students in attendance at the *Philadelphia College of Pharmacy* is something over 750. Over 40 per cent. of these come from outside the State of Pennsylvania.

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## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

*Practical Urinalysis and Urinary Diagnosis.* By Charles W. Purdy, M.D. The F. A. Davis Company, Philadelphia. 1894. Pp. 357.

If the author had possessed a more exact knowledge of the science of chemistry, he might have written a book that would have been a necessity to every one studying this subject practically. We do not like his loose chemical nomenclature, as illustrated by calling stronger ammonia water "strong ammo-

nium (U.S.P).” “Caustic potassium” is neither the correct popular name nor the correct scientific title for potassium hydrate.

The author gives his own method for the estimation of glucose. It is volumetrically determined by an ammoniacal Fehling's solution. We do not believe that any one in following his method will obtain “a perfectly *transparent and colorless*” end reaction, unless phosphates are first removed, and nothing is said about that. As long as physicians adhere to the volumetric process for estimation of glucose, just so long will they be disappointed. The gravimetric method is the only one that will give exact results, and there is nothing said about it in this work.

We are inclined to overlook the chemical shortcomings when we consider the excellent illustrations, and the appendix, which is devoted to the examination of urine for life insurance.

*Modern Materia Medica.* By H. Helbing, F.C.S. Fourth enlarged edition. New York: Lehn & Fink. London: H. K. Lewis. Pp. 295.

In the two years that have elapsed since the publication of the third edition, the list of synthetic remedies has been enormously increased, yet the author has endeavored to include them, and with fair success.

Two additional tables have been added in this edition, which greatly enhance the value of the work, namely, a table for the detection of the new remedies in urine, and a table of commercial names.

To illustrate how closely this work has been revised, we may state that a page is devoted to *diphtheria antitoxine*, wherein one may learn the nature and source of this substance, as well as its properties and uses.

Every pharmacist should have this work within easy reach, and he will not then be “all at sea” when a prescription is presented for a new remedy which he may easily have missed hearing about.

*The Manufacture of Liquors and Preserves.* Translated from the French of J. De Brevans. New York: Munn & Co.

The value of this work consists in the large number of formulas contained in it.

*A Text-Book of Volumetric Analysis.* By Henry W. Schimpf, Ph.G. New York: John Wiley & Sons. 1894. Pp. 400.

An American text-book of 400 pages has long been needed. This one strikes us as partly meeting that requirement. When, however, the author undertakes gasometric analysis he fails to make it full enough to be of much value to either the pharmacist or the pharmacy student. We fail to understand what place the chapter on glucosides, of less than a page, has in a book on volumetric analysis. It is also misleading to consider milk as a substance to be estimated volumetrically. The same may be said of a page devoted to the analysis of urinary calculi, which was taken from Muter's “Analytical Chemistry.”

Volumetric analysis has its limitations, and if the author will revise with that fact more prominently in view, he may yet produce a standard text-book.

*Consular Reports.* Vol. XLVI, No. 169.

The most interesting report in this number is that on the cultivation of “Chicory in Belgium.” We learn that Belgium produces annually 280,000 to

350,000 tons of this adulterant for coffee; 4,000 tons are sent to the United States.

*Syllabus of Lectures on Human Embryology*: an introduction to the study of Obstetrics and Gynæcology. For Medical Students and Practitioners. With a Glossary of Embryological Terms. By Walter Porter Manton, M.D. Illustrated with seventy (70) outline drawings and photo-engravings. 12mo. Cloth. Pp. 126. Philadelphia: The F. A. Davis Company.

The above work, which gives, in a clear, concise and well-illustrated manner, the essential facts of human embryology, is well adapted to the needs of the busy medical student. It is so arranged that it can be used in the class-room by the teacher if desired.

An interesting section is added, giving instruction for practical work.

C. B. L.

*Proceedings of the New York State Pharmaceutical Association*. An account of this meeting was given in the August number of this journal.

*Proceedings of the Tenth Annual Meeting of the Minnesota State Pharmaceutical Association*, held in June, 1894.

*Semi-annual Report of Schimmel & Co.*, Leipzig and New York, October, 1894.

*Pharmacy a Science*. Introductory address before the Albany College of Pharmacy. By Willis G. Tucker, M.D., October, 1894.

*Proceedings of the American Academy of Arts and Sciences*. From May, 1893, to May, 1894. Boston, 1894.

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## MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, November 20, 1894.

The meeting was called to order by electing Dr. A. W. Miller as chairman.

The reading of the minutes was dispensed with. Dr. Judson Daland explained to the meeting the structure and use of an instrument invented by him, called the Hæmatokrit. The instrument depends upon the effect of centrifugal force carrying the heavier portions of the blood to the further portion of the capillary tube, that by means of a system of multiplying wheels is made to revolve 10,000 times in a minute, this enables the operator to examine the blood so as to detect any variations which a sample of blood submitted to inspection may have when compared with a sample of normal blood. At first it was supposed to be necessary to dilute the blood in order to inspect it, and a 2½ per cent. solution of potassium bichromate was employed; but this was abandoned. It was found by experiment that 51.6 per cent. by volume were corpuscles, the red corpuscles being at the furthest extremity of the tube and the white corpuscles arranged next to them. Their relation being as one white to five hundred red corpuscles—to effect this properly the handle should be revolved seventy-seven times in a minute; if the measuring tube is not revolved with sufficient rapidity, the corpuscles will be too loosely packed, and the indication will not be fair and true. The excellence of this instrument over the usual mode of estimation by micrometer counting is very great, as a truthful result can be

obtained in a few minutes, while counting with a microscope occupies some two hours of most tiresome, nerve-wearing labor.

A vote of thanks to Dr. Daland was given unanimously for the interesting description of the instrument and its methods of use.

Mr. Wm. B. Thompson, secretary of the College, presented volumes of the Pennsylvania State Board of Health Reports, which he had received from Dr. Benj. Lea, secretary of that body.

Mr. England presented on behalf of Mr. Bullock, president of the College, a specimen of saigon cinnamon of very fine quality, also leaves and fruit of the *Sophora Speciosa*, a plant growing in Texas, the alkaloid of which was examined by Dr. H. C. Wood, of the University of Pennsylvania, some years since.

Mr. Thompson read a few notes on subjects of great interest to pharmacists, especially that of the use of *acetic acid in the preparation of fluid extracts*, advocating the systematic study of this menstruum for exhausting many drugs that are now only treated with alcoholic menstrua, pointing out the advantage which would accrue to the trade at large should such experiments prove that the advantage anticipated could be obtained. Its solvent\* power is very much greater in some cases than that of alcohol, but it would be premature, from any experiments yet made, to conclude its universal adoption advisable. Prof. Remington stated that a number of experiments had been made by Dr. Squibb on a variety of substances—particularly *nux vomica*—and a number of spices and flavoring materials, with very good results, so also with some of the alkaloidal drugs (*cinchona* excepted especially). It also promises favorable results for solid extracts, as the acid would be entirely dissipated in the concentration. Before such extracts can supplant the present solid extracts close study and careful experimentation will be required.

A short summary of the *Chemical remedies*, which have been lately vaunted so freely, was given.

*Flesh extracts* also were reviewed, showing the tendency of such methods and their uselessness, while a more rational employment for the truly educated pharmacist was pointed out in the study of plant foods or soil analysis as being of incalculable value to the agriculturist, who would intelligently direct his labors in enriching the soils and gaining plenteous harvests to reward his toils.

The question of the value of those preparations of cod-liver oil which contain no oil was brought up, and the expression of those best informed was that cod liver oil was in no sense a medicine, but a food readily assimilated by many whose digestive apparatus was unable to assimilate any other fat oils; the theories of the chemical constituents of cod-liver oil being extracted and given in condensed forms has been long relinquished.

The use of pure olive oil was noted as being useful in the same way, and one of the physicians of the Philadelphia Hospital gives with advantage an emulsion of olive oil and eggs to infants suffering with marasmus.

Attention was called to the *Observation Sheets* which had been proposed by Professor Patch, of Boston, intended to be used by the pharmacist or manufacturer in noting difficulties experienced in the routine of his business and the ways adopted for remedying the same.

The character of cinnamon and cassia was commented on, one stating that the only cinnamon he could use was Ceylon, as it had a fine flavor, while most of that offered as cassia was like so much inert matter.



Batavia cinnamon, which was in the market at one time, was destitute of any cinnamon flavor, and was even mucilaginous.

But those who deal in spices largely are now in the habit of adding saigon cinnamon to the ordinary cassias when having them ground—and those who use this spice (the bakers) find this cinnamon to give the flavor they require for their business. It was thought that the low-grade cassias had been already partly deprived of their flavor before being sent abroad—another instance of Chinese sharpness of a vicious kind.

The Committee on Tax-free Alcohol reported progress, and presented a circular letter (see below), which they are sending to pharmacists throughout this section of the United States.

Specimens of different varieties of petrolatum were exhibited by Mr. Jos. W. England, and attention was called to them.

There being no further business, an adjournment was ordered.

T. S. WIEGAND, *Registrar.*

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## CIRCULAR LETTER TO PHARMACISTS.

### COMMITTEE ON ALCOHOL LEGISLATION.

PHILADELPHIA COLLEGE OF PHARMACY,  
145 NORTH TENTH STREET, PHILADELPHIA.

DEAR SIR:—At a meeting of Pharmacists held at the Philadelphia College of Pharmacy on Tuesday, October 16, 1894, the section of the Tariff Bill enacted on August 28 last, relating to the repayment of tax on alcohol used for manufacturing purposes was discussed.

The section reads as follows:

“SECTION 61.—Any manufacturer finding it necessary to use alcohol in the arts, or in any medicinal or other like compound, may use the same under regulations to be prescribed by the Secretary of the Treasury, and on satisfying the collector of internal revenue for the district wherein he resides or carries on business that he has complied with such regulations and has used such alcohol therein, and exhibiting and delivering up the stamps which show that a tax has been paid thereon, shall be entitled to receive from the Treasury of the United States a rebate or re-payment of the tax so paid.”

Resolutions were unanimously adopted asserting the desirability of having enforced the law relating to rebate of tax on alcohol used in making medicinal preparations. The members of the Philadelphia College of Pharmacy placed themselves on record as favoring tax-free alcohol for manufacturing purposes, and urged pharmacists to work in the interest of having the law retained and enforced, instead of being repealed.

At that meeting the undersigned were appointed a committee to place the question of tax-free alcohol before the retail pharmacists of the country, and to endeavor to have their views upon this matter of vital interest to their business properly presented to Congress and the executive officers of the Government.

It was stated that the wholesaler, the manufacturing pharmacist and the patent medicine manufacturer had all presented their views, but that retail

pharmacists had not expressed their opinions, although, in point of numbers and legitimate use of alcohol in preparing medicinal preparations, they were more concerned than any other class of manufacturers.

The present tax on alcohol, \$1.10 a proof gallon, amounts to \$2.09 on every gallon of 95 per cent. alcohol, and this represents in many medicinal preparations the largest item of cost. According to our best information, there are about 40,000 drug stores in the United States. A very conservative estimate, it is believed, of the amount of alcohol used by each one annually in preparing medicines, would be two barrels of forty gallons each.

Such an allowance would indicate that the Government will collect as a tax from this source during the present year \$6,688,000. The cost of our preparations are thus artificially increased to this extent, necessitating the employment of a large amount of capital from which no profit is derived.

During the year 1893, alcohol was supplied to the retail drug trade in Philadelphia at an average price of \$2.18, of which amount but thirty-nine cents represented the cost of the alcohol, and \$1.79 the tax on each gallon. This will give some idea of the degree to which medicinal preparations have been unjustly enhanced in value by the retention of the high tax on alcohol, and from this we ask relief.

We have no solvent that will take the place of alcohol in the extraction of most drugs; and in the preparations into which it enters, it becomes as much a part of the medicine as the contained drugs or chemicals. To no other cause so much as to the high tax on alcohol, extending over a period of more than thirty years, can be attributed the fact that the retail pharmacist has been largely diverted from the true character of his business.

The difficulty of recovering alcohol used in the manufacture of preparations on the small scale, has rendered this part of his calling no longer profitable, as he could not compete with the large manufacturer with facilities for working on an extensive scale. As a consequence, the manufacturer has flourished, and deprived the retailer of a large portion of his legitimate occupation.

With tax-free alcohol at thirty-five to fifty cents a gallon, every pharmacist could economically and correctly prepare his own medicinal preparations and would be responsible for their purity; and thus the public would be protected from fraud. Tax-free alcohol would undoubtedly greatly improve and extend our knowledge of pharmacy.

It is the retail druggist who directly supplies the needs of the public, and through him it will derive such benefit as will result from the enforcement of this act. Some manufacturers have urged upon the Secretary of the Treasury such a restrictive application of the law as would exclude the retail druggist from its benefits. This, the very class through whom the benefits will be disseminated, and whose claim from a moral and economical standpoint should be the strongest, must now assert themselves, lest they be entirely ignored and excluded from sharing in the advantages of the act.

While the law has been enacted, this particular section requires that regulations are to be prescribed by the Secretary of the Treasury, and as such regulations have not been framed, it remains inoperative. The reasons assigned for the non-enforcement of this section of the act are:

- (1) The loss of revenue that would legitimately occur if the section is

enforced. The amount of tax collected by the Government from this source, as shown above, is large; but, surely, this argument entirely loses its force, if we but stop to think who ultimately pays this tribute-money—the sick, the infirm, the wounded, the dying. Can we admit for one moment that the most enlightened nation of the nineteenth century finds it necessary to place a penalty upon her unfortunate sick? Surely such a barbarity cannot be defended and continued by an American Congress.

(2) The difficulty of framing regulations that would permit those entitled to receive the rebate provided for by the act, and at the same time amply protect the Government from imposition and fraud. This has been magnified into an insurmountable mountain. The Government has here a task, we believe, no more difficult than that of preventing illicit distilling, illegal brewing or manufacture of tobacco, with all of which it has successfully dealt. This Committee is not willing to admit that the great body of American pharmacists are not honest and ready to uphold any just regulations that may be imposed by the Treasury Department in the enforcement of this act. Pharmacists do not desire a rebate of the tax on alcohol entering consumption as cordials, bitters and beverages, nor on spirituous, distilled or malted liquors sold as such, but only on such alcohol as is legitimately used in the manufacture of medicinal preparations.

While hardly within the province of this Committee to outline regulations for the Secretary of the Treasury, we have reason to believe that any practical suggestions would be welcome. The Committee is of the opinion that regulations can be adopted as safeguards against the improper usage of alcohol on which tax is rebated, and has in mind already an outline of what those regulations should be, and would request suggestions from others on this subject.

(3) The neglect of Congress to make the necessary appropriation for carrying this section of the law into effect. This objection is not a permanent one, and can be easily remedied at the next session of that body. The cost of enforcing this section of the law will depend largely upon the regulations prescribed, but we have no reason to believe that it will be unduly large.

The Committee would urge upon every druggist the necessity of exerting his influence in the direction of having this law enforced. We ask you to personally present this subject in all its bearings on pharmacy to the attention of your Congressional Representatives. The Committee requests the attention of pharmaceutical journals and pharmaceutical associations to this, the most important question affecting pharmacists that has arisen in years. We solicit your earnest co-operation. Get every pharmacist thoroughly aroused to its importance, and urge upon him the necessity of concerted action toward securing the necessary legislation to make the law operative.

The Committee requests that every druggist promptly send answers to the following: (Address your replies to the "Committee on Alcohol Legislation," Philadelphia College of Pharmacy, 145 North Tenth Street, Philadelphia, Pa.)

- (1) What classes of pharmaceutical preparations do you now prepare?
- (2) With tax-free alcohol what others would you prepare?
- (3) How much alcohol do you estimate that you have used in the manufacture of pharmaceutical preparations only during the year 1893?

(4) What suggestions do you offer as to the character of the regulations that should be prescribed by the Treasury Department to prevent fraud?

Yours respectfully,

GEORGE M. BERINGER,  
*Chairman.*

WILLIAM MCINTYRE,  
ROBERT ENGLAND,  
RUSH P. MARSHALL,  
JOSEPH W. ENGLAND,  
*Secretary.*

*Committee on Alcohol Legislation.*

PHILADELPHIA, November 1, 1894.

## OBITUARY.

*William Silver Thompson* died at his home in Waverly, near Baltimore, Md., on Wednesday evening, October 31, 1894. He was a member of the drug firm of Andrews & Thompson, and was at one time president of the Maryland College of Pharmacy. He was also a member of the American Pharmaceutical Association, the Maryland Historical Society and the Maryland Academy of Sciences. The deceased had been a druggist fifty-five years. He was born in New Castle County, Del., in 1823, and went to Baltimore to engage in business when he was sixteen years of age.

The Maryland College of Pharmacy passed suitable resolutions concerning the deceased.

*Dodder.*—These plants, belonging botanically to the genus *Cuscuta*, are among the most troublesome of parasitic weeds to the gardener and farmer in the Old World. Some of the species have become so destructive in French agriculture and horticulture, that the Prefect of one of the large provinces, *Charente-Inferieure*, has issued instructions, which are circulated freely among cultivators, making it obligatory on every one to destroy the plants wherever seen. The mandate is accompanied by descriptions by which the cultivators may know the pests as soon as they have begun their growth. It is remarkable that the plant is an annual, and commences its growth by seed in the ground as ordinary plants do; but after they find something to attach themselves to, they draw their sustenance from the host plant, and then the connection between the plant and the soil dries up, and the plant is completely severed from its terrestrial connections. The plant belongs to the natural order of *Convolvulaceæ*, that is to say, the section to which the common morning-glory belongs, and some of these, as, for instance, in the common moon-flower, have warty excrescences along their stems which some have supposed to be young, abortive, aerial rootlets. A recent communication to a scientific society considers these excrescences to be incipient haustoria, which is the name given to the little suckers which are thrown out from the dodder, and which penetrate the host plant and furnish food to the parasite. In other words, it might be stated that these morning-glories are in an incipient state of evolution toward the parasitic condition.—*Meehan's Monthly*, for November, 1894.



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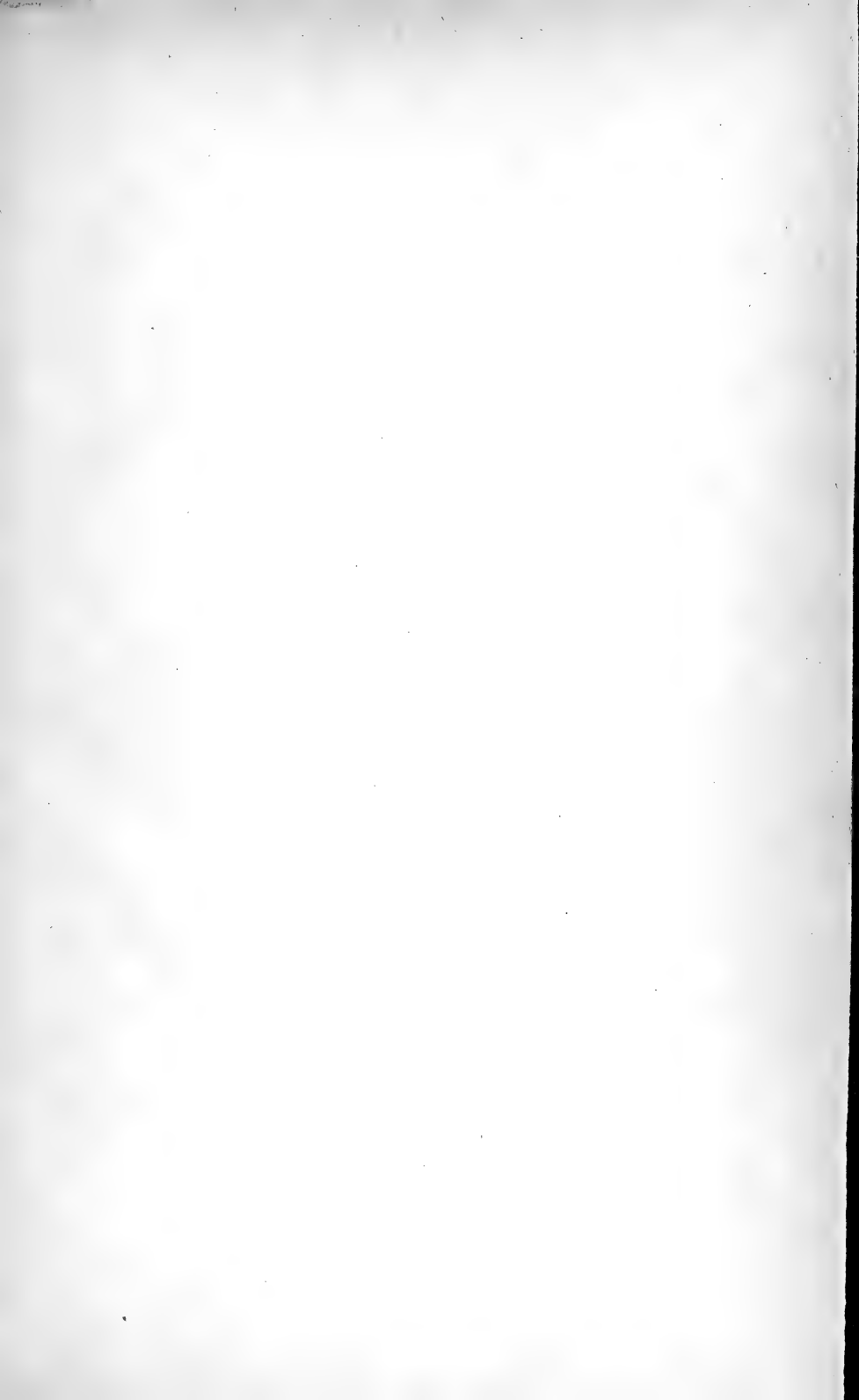
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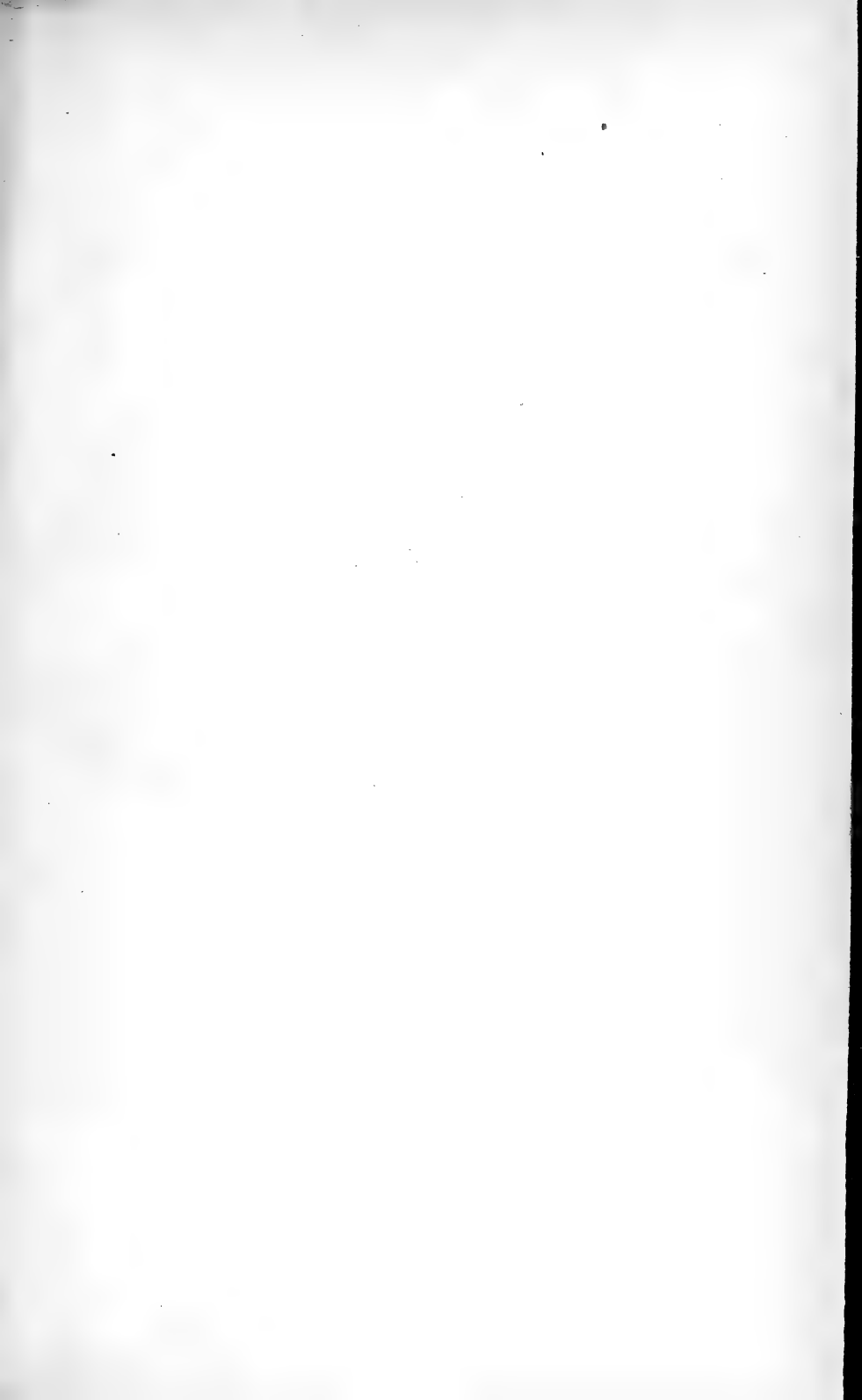
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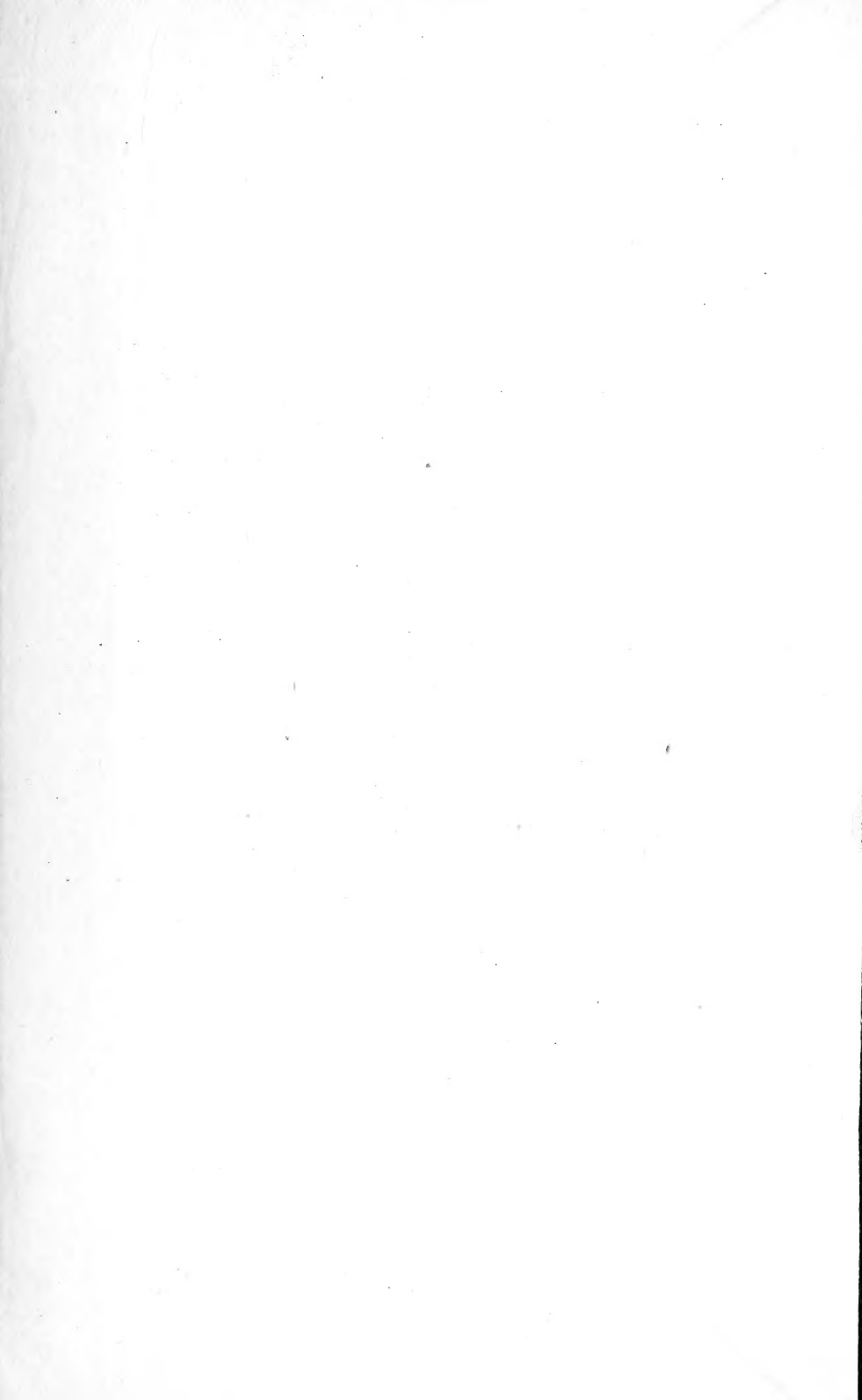












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